

MOTOR AGE

Vol. 3 No. 2

JANUARY 8, 1903

Five Cents

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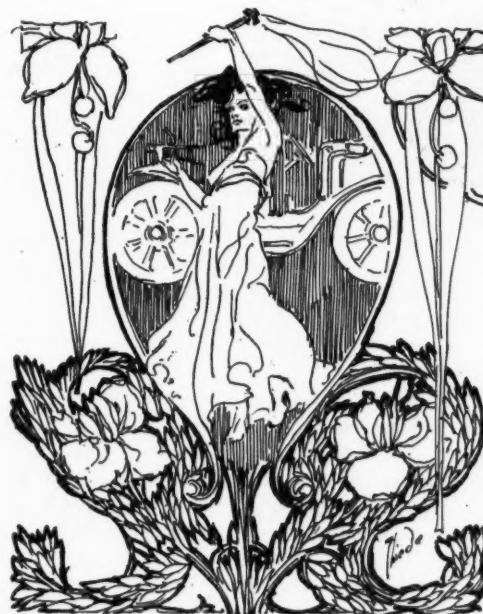
MOTOR AGE

VOL. III. NO. 2.

JANUARY 8, 1903.

\$2.00 Per Year.

AT THE PARIS AUTOMOBILE EXHIBITION



MOTOR BICYCLES SHOWN

circular cradle, to the lugs of which are attached the seat mast, lower reach and rear forks.

The motor cycles made by the Fabrique Nationale d'Armes, commonly known as "F. N." motor bicycles, have excellently finished engines of $1\frac{1}{2}$ to 2 horsepower, which are strongly and centrally held in a division of the lower reach tube. The crank chambers are of cast iron, cleanly finished and gun browned, and make a particularly neat appearance. The engines are, of course, provided with the well-known F. N. carbureter.

THE CLEMENT

Perhaps the feature of the show, so far as motor bicycles go, is the two cylinder Clement, in which the engine is carried at about the center of and on the right of the seat mast, with the heads of both cylinders pointing forward. The cylinders are at an angle of about 20 degrees with each other. The crank chamber is on the right side of the seat mast, while a fairly large and heavily-rimmed fly wheel is carried outside the long crank shaft bearings on the left of the tube. The belt pulley is set inside the fly wheel, so that the latter serves to balance the two cylinders and crank chambers.



There is also shown the four cylinder Clement bicycle, which, ridden by a plucky rider, recently covered a mile at the speed of 65 miles per hour. The frame of this machine is of necessity specially built to take the four cylinders set V wise longitudinally in pairs and carried in a particularly heavy forging that makes the lower angle of the frame. The drive is by a spur pinion and gear—the latter being on the crank bracket shaft—and thence by chain to the axle of the rear driving wheel. It is built only for speed feats.

THE WERNER

The new Werner motor bicycles, of which a goodly show is made, are chiefly remarkable for the new commutator case, which takes the form of a cylindrical metal case, with bracket securing it to, but independent of, the crank chamber. The ignition cam of the two-to-one shaft is carried on the projecting end of the latter, and makes contact between the contact blade and platinum tipped screw within the commutator by pressing the end of the blade upward, the blade projecting through a slot in the circular case to meet the cam. It is covered with a sheet of mica, so that the operation of blade and screw can be observed from without. The entry of oil to the commutator is impossible, and the platinum tipped screw can be adjusted and locked in position from the outside.

Another feature of the Werner is the

PARIS, France, Dec. 24—Despite the wonderful exhibition of wonderful automobiles, and despite the truly great progress in the construction of these vehicles during the past year, as made evident by the displays at the Grand Palais, the production of motor bicycles and their improvement as represented by the show are not equally important. An English critic, in comparing the greater progress in motor bicycle building in England, asserts that the French, in their great enthusiasm and desire to lead in the automobile industry, have temporarily forgotten the motor bicycle, except as it is developed for the special purposes of racing and pace setting. There are not a great many motor bicycles shown, but the ones which are exhibited are of prominent reputation, excepting, of course, a few novelties and one or two actual freaks.

THE ROCHE

The Rochet motor cycles, shown on the same stand as the Rochet automobiles, are built in accordance with the well known La Chapelle patents, providing two speeds. A refinement of more or less value is found in the connection of the lever for the compression tap with the link that serves to hold open the exhaust valve. When the exhaust valve is lifted the compression tap is opened. A scavenging result may ensue from the draught thereby established in the combustion chamber. The crank chamber in the Rochet is held in an inverted semi-



MOTOR AGE

General View of the Salon

employment of the underside of the belt rim as an internal brake drum, against which a long, curved feather-faced brake spoon is caused to press by means of a stout lever and wire connections to handlebar. The brake lever is pivoted on a bearing block attached to the left rear fork. The motor belt pulley is made with raw hide center and metal flanges. The gasoline and air levers are conveniently set on the upper reach close to the steering head.

THE TERROT

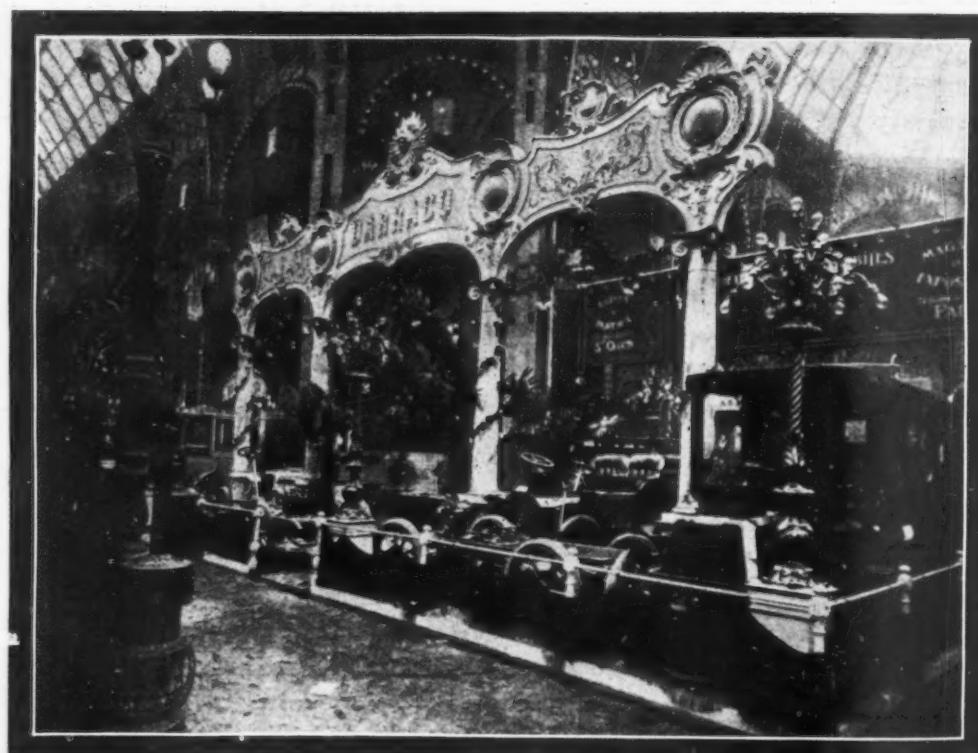
Terrot shows a motor cycle of ordinary arrangement, save that the motor pulley is of double belt width, a flat belt being used, and divided, the inner half being fast to the motor crank shaft and the outer loose. A form of leather edged belt shifter is fitted on the seat mast, and the belt can thereby be run from the loose to the fast pulley, and vice versa, by a lever conveniently placed on the upper reach tube. It might be well with this arrangement to connect the belt shifting lever with the ignition or the exhaust valve lifter, so that when the belt is run onto the loose pulley the engine is at the same time slowed down, or stopped altogether.

THE WATER COOLED DOUE

The motor cycle shown by G. Doue has a neat motor, with the combustion chamber and cylinder water cooled. The water tank is made into the forward end of the metal case suspended from the upper reach, and is provided with several longitudinal air tubes opening rearward into a space provided at the rear of the tank. A small nest of flanged radiator tubes, about 4 feet in total length, are set on the upper reach tube immediately in the rear of the steering gear. The heated water passes from the top of the cylinder to the lower end of the radiator and from the top of the radiator to the top of the tank. The cooled water passes from the bottom of the tank to the lowest point of the cylinder.

THE BUTLER

The two machines shown by Porteus Butler have each 1½-horsepower Universal motors, the cylinder



MOTOR AGE

THE DARRACQ AUTOMOBILE DISPLAY

walls of which are drilled round with a series of $\frac{1}{4}$ -inch holes just at the end of the travel of the piston, so that upon the return stroke air is admitted to the interior of the piston and crank chamber. This arrangement, doubtless, has its good points from the cooling point of view, but by these cylinder orifices it seems that more dust than is desirable would find its way to the interior bearings.

The drive from the motor pulley is by belt to a pulley on a crosshead fitted in the angle between the seat mast and rear stays, and thence by a spur pinion and gear to the driving wheel. A bicycle with similar drive is also shown with a motor of 3 horsepower, having two cylinders set on the crank chamber at an angle of about 30 degrees.

The Griffon motor bicycles are provided with

motors of various powers, driving from the motor shaft to a secondary shaft by a spur pinion and gear, and thence by sprockets and chain to the rear wheel. The sprocket on driving wheel axle carries a form of Crypto gear, normally driving directly on the wheel. Upon a brake band being applied to it, however, by a lever on the upper reach tube, the gear is put into effect and the first or low speed given.

THE PERFECTA

The firm making the Perfecta cycles is one of the few showing motor tricycles—indeed, the exhibition at the Palais is singularly lacking in this class of machine.

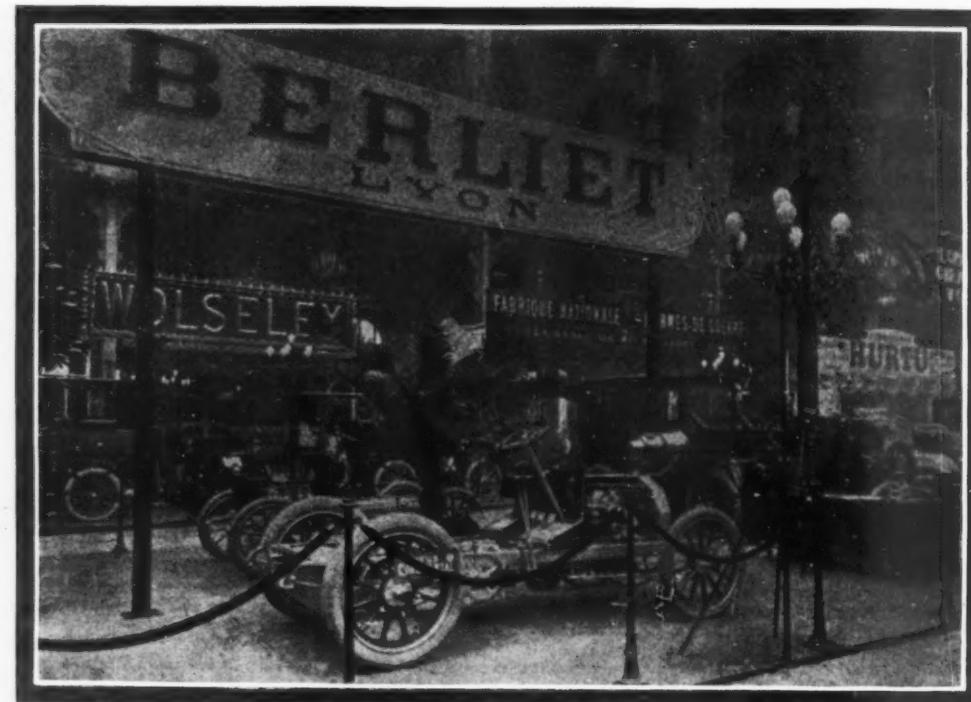
The Perfecta tricycles and quads are fitted with water cooled engines and with horizontally divided cylindrical tanks serving for water, gasoline and oil, and as radiators. A Dupont form of two speed gear is fitted, so that the drive can be disconnected from the motor by means of a conical friction clutch. Several motor bicycles are also shown, but offer no special features, save the adoption of the Zedel motor, a neat and well finished pattern of Swiss construction.

THE STIMULA

In the Stimula motor bicycle is an example of the belt pulley rim being employed as a brake drum, but, unlike the Terrot, it is the outer and not the inner surface upon which the leather covered brake shoe is caused to bear. A ratchet clutch is carried on the left side of the crank bracket, between it and the crank boss, and a lug at the top of the clutch disk is pivoted to the end of the brake rod. Back pressure upon either crank applies the brake shoe to the belt ring, and most effectual braking is exerted. A strong spiral spring bearing upon a block between the brake rod and a stud on the left rear stay, which also serves as a brake rod guide, takes the brake off the belt rim as soon as the pressure upon the pedal is released.

THE GAUTHIER

In the "auto-fauteuil," shown by Gauthier & Co., is an attempt to substitute a little railed seat, grandiloquently term-



MOTOR AGE

THE BERLIER AUTOMOBILE DISPLAY

ed a fauteuil, for the usual saddle. The crank chamber of the 2½-horsepower motor is carried by stout segmental lugs terminating a horizontal continuation of the lower reach tube and the rear forks, respectively. To the underside of the crank chamber are fitted a pair of spring struts. When these are turned down upon the ground, the machine will stand alone, and the engine can be started in the usual way, running free. The rider then mounts the "fauteuil" by means of fixed footrests, and allows the engagement of a coned friction clutch formed in the motor pulley. When the machine starts the spring struts gather themselves up and lie snugly below the back stays.

The male portion of the clutch, which is fast upon the motor crank shaft, is thrust against the internally-coned portion of the motor pulley by a strong spring, which is restrained by a wire from the left handle.

THE MOTASCOPE

An attempt to permit the easy transposition of ordinary bicycles into motor bicycles is

fork ends. The hub of the driving wheel runs on ball bearings on this fixed axle. The cylinders, of course, rotate with the wheel, of which in a measure they serve as the spokes. The fuel and current are introduced to them through the hollow axle and suitable drilled bosses and connections within. The exhibitors claim great efficiency for this machine, as the back wheel, with its revolving mass of cylinders, acts as an efficient fly wheel, while the cylinders are easily kept cool by their rapid rotation.

IDLER PULLEYS IN FAVOR

Idler pulleys mounted on rocking levers, and actuated by hand levers fitted with ratchets engaging rack sections, appear to be favored by French makers of belt driven motor cycles. They seem to regard the extra friction of these additions as a matter of but little moment, and fit them to bear on the driving side of the belt.

Few machines are fitted with surface carbureters, but in one of these, the Heck, the carburetor is made with a series of angular

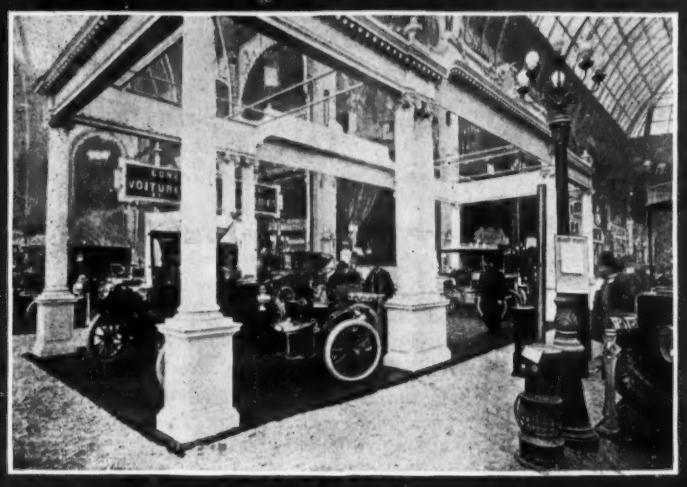
of this profit, especially in view of having borne the heavy expense of insurance.

Although the greatest fear of competition from foreign builders was that relative to the German industry, the Darracq company sold 200 machines to a German dealer.

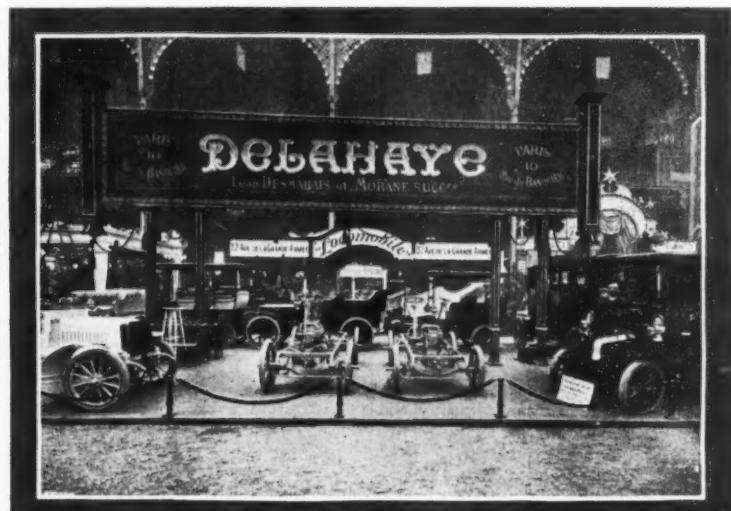
There were exactly 762 exhibitors at the show this year. The total expense in arranging their several displays amounted to about \$180,000.

Of the different makes of gasoline cars exhibited five were equipped with both battery and magneto, seven with magneto only and forty with battery only.

The French makers took every possible advantage of applied electricity to demonstrate the features of their cars. Several makers showed a chassis with the wheels just clear of the ground, with an electric motor belted on to the clutch drum, and thus were able, by touching a switch, to put the whole of the car mechanism into motion to show to perfection the action of the change-speed gears, brakes, clutches, and valves. More could thus



The Panhard Exhibit



The Delahaye Exhibit

found in the Motascope, which is a triangular frame of duplex tubing, capable of being attached to the forward diamond of standard frames. It contains a snugly packed low powered air cooled motor, coil and battery cases, carburetor, and gasoline tank. This outfit fitted, it is only necessary to fasten a belt pulley to the spokes of the driving wheel and slip on the belt to complete the motor bicycle.

THE JOUGLARD

A motor cycle shown by E. Jouglard has a large diameter internal spur gear running free on the crank bracket shaft. It is driven by a small pinion which is carried on the outer end of the motor shaft. In the hub of the internal gear is formed part of a friction clutch, the other, or male portion, of which moves laterally in the hub of the driving chain sprocket. When the clutch is allowed to engage, the drive is direct to the rear wheel.

THE AUTOMOTRICE

In the Automotrice is a motor bicycle which "out-Singers" the Singer, inasmuch as it is provided with four cylinders of about 1½ horsepower, each within, and forming part of, the driving wheel, which has no through axle. The cylinders are set in the wheel at 90 degrees, and the connecting rods have a common bearing upon the crank pin of the crank of a fixed, hollow crank axle carried in the rear

screens, to obviate the excessive splashing of the gasoline and the subsequent super-carburation of the air.

FACTS OF THE PARIS SHOW

Attendance Large and Mainly Paid—Over a Million Dollars' Worth of Vehicles Shown

At the Paris show the attendance on the first Sunday was about 60,000 and on the second Sunday about 50,000. The daily attendance was from 10,000 to 20,000, of which fully four-fifths was paid admission.

It is said that not only did the manufacturers exhibiting at the show receive large numbers of orders, but that several were forced to turn down orders during the latter days of the exhibition on account of having sold beyond the probability of immediate delivery, and, in some cases, up to the producing ability for the entire season.

The approximate value of all the exhibits at the salon was \$1,200,000. The cost of the insurance on the exhibits for the two weeks was \$24,000. This rate of insurance amounts to \$577,000 for a year, representing 48 per cent of the total value.

It is estimated that the show will net a profit of between \$80,000 and \$100,000. The exhibitors feel justified in asking for a share

be learned in 5 minutes than from hours of reading.

Considering the fact that numerous French makers have studiously copied the Mercedes construction in many important particulars and display machines which strongly resemble the Mercedes patterns displayed, and, furthermore, considering the fact that the said Mercedes patterns are of 1902 construction, while the 1903 Mercedes models are still under cover, the French industry represented by the show surely indicates a "horse" on somebody not German.

The price of admission was 1 franc or 20 cents, except on Fridays, when the charge was 3 francs or 60 cents.

The price of space ranged from \$9.50 a square meter (39½ inches square) to about \$4. Wall space was \$2.80 a square meter.

The division of the profits was: 67 per cent to the Automobile Club of France; 13 per cent to the Chambre Syndicale du Cycle et de l'Automobile; 13 per cent to the Chambre Syndicale de l'Automobile, and 7 per cent to the Syndicat des Fabricants de Cycles.

Summarizing the exhibition the wits say it was a great show for the "Mors-cedes."

On one day, the second Friday, 80,000 persons clamored for admission. It was difficult to handle the throng.

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PERSONAL INTEREST

It would probably puzzle any reader, or any combination of readers, to discover any industry, ancient or modern, foreign or domestic, which ever attained prominence with such phenomenal rapidity as did the manufacture of automobiles. If we except the few experimental essays of 1894 and 1895 and confine our attention to the actual production of vehicles on a commercial basis, it will be found that the industry in America is entering upon the fourth year of its existence. One is apt to refer to the manufacture of bicycles as an example of phenomenal progress. It certainly was one, and in many respects the bicycle accomplished wonders, including the development of structural features without which the automobile of today were a far from perfect creation. And yet, but a few days ago, an investigation by two experts, one familiar with every phase of the bicycle business, the other a close follower of the automobile industry, indicated that the value of the output of automobiles during the third year of manufacture had been almost as great as that of the cycle trade in its palmiest day.

How has this been accomplished? By personal interest. Not, unfortunately, at first, in the machines themselves, but in the men who operated them. It became the proper thing among followers of society. But out of this beginning came much good—a demand for home-made machines, at reasonable prices. Then came the formation of clubs, the promotion of tours and the arrangement of races, all excellent factors in the increase of interest in the industry and the sport.

But we seem to have already reached the turning point. Clubs flourish—on paper—in many large cities and some small ones. But, in fact, there is not a genuine automobile club in the United States. Three are heard of frequently, the A. C. A., Long Island and Chicago. But they are shadows. A few—a very few—enthusiasts carry on the work. The rooms or clubhouses are practically deserted. The experience meetings and lectures of two years ago are no longer in evidence. Nothing

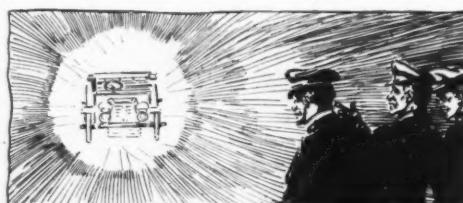
is being done to draw the members together and sustain their personal interest in the sport. This is regrettable for two reasons; first, because good fellowship is, or should be, inseparable from so glorious a sport; second, because the industry is of such vast importance as to deserve all possible encouragement.

The sport and the trade will continue to flourish. Clubs or no clubs, the movement will grow. But it will take on, soon enough, a purely commercial aspect. It would be a misfortune to automobilists and a disappointment to the trade were the present apathetic condition of club life permitted to continue.

1903 GASOLINE CARS

The first query of a possible buyer of a gasoline automobile of this season's vintage is likely, if he is an intelligent buyer, to be: "In what manner has the trend of construction changed since a year ago?" He will determine individual improvements afterward. First of all he wishes to know what the whole trade is doing, and what are to be considered as the generally accepted improvements. Briefly, he wants to know what makes a machine up-to-date.

To answer his query is not as easy a task in this country as it would be in France; for there all the makers seem to have copied the plans of the German fortifications and attempted to beat the Germans at their own game. The tendency of French construction of gasoline cars for this year is to Germanize them, which amounts very much to the same thing as Mercedizing them. Pick out the principal features of the Mercedes car as it is



and one has the most important lines of improvements that make French cars up-to-date.

But it is not this way in America. There is less uniformity in ideas of construction and there is probably no machine which by virtue of its precedence in the introduction of valuable features can maintain in our trade the envious position occupied by the Mercedes in Europe. Incidentally, when one realizes that the Mercedes is the output of the establishment the foundation in actual working and mechanical ideas for which was laid by Daimler, father of the automobile industry, it seems fitting enough that the machine should have come to its own on the continent.

Returning to America it is found to be true that all of the many first-class machines are good by different means. There are many points in construction which are justly popular and commonly used, but there is no particular system of construction which leads. The changes of the year, then, revert to those of the general design of the patterns and to the construction of the detail.

The first consideration is characterized by the widespread tendency toward heavier construction. This tendency has been pointed out year after year. More than any other country America stuck close to bicycle construction when introducing the automobile. The breaking away has been gradual. But the vehicles have grown steadily heavier. For 1903, however, increased weight does not ap-

ply so much to the mechanical as to the commercial end of the industry.

The vehicles may not be heavier per horsepower, but the trade has met a great demand for heavier and more powerful patterns. The touring cars have been increased in power and speed, and in between them and the light runabout has crept a moderate weight car which has no well defined cognomen, but which is nevertheless to be a mighty factor in the trade this season. It ranges from 6 to 12 horsepower and is generally of single seat construction, with either a folding front or a detachable rear tonneau or dos-a-dos seat.

It is neither a runabout nor what is commonly accepted as a touring car. It serves the purposes of both for those who cannot afford the latter and who wish more extended and rougher service than might be rationally expected of the former. It is in most instances strong and durable and of long radius on a single charge of fuel; yet the attempt of the manufacturers has in most cases been to keep it in the same simplicity class as the lighter cars.

In detail improvement the new cars show such features as mechanical feed lubrication, better water circulation and cooling radiation, more convenient fuel regulation or throttling, spark governors, stronger axles and a more extended use of sliding gear transmission.

In design the whole tendency is European. The motor bonnets of motor-front machines are larger and becoming square in contour, while the dashes of most of the motor-back cars, little and big, are built up, box like, in emulation of the motor bonnet. Divided driver's seats are common on the big machines and all seats are wider, deeper and more comfortably upholstered. There is a remarkable advance in the degree of finish. Wheel steering is more popular and the reachless running gear, generally of angle steel, with semi or three-quarter elliptical springs and radius rods, is replacing the tubular reach frame. Wood wheels and artillery pattern tubular wheels are growing in number, while detachable tires are likewise gaining precedence.

An encouraging note is the attention being paid to making the motor and transmission gear and appurtenances more readily accessible; while along the same line of convenience for operators comes such neat small fixtures as dash board registers to indicate the character of the water circulation and glass or mica covered commutator cases for multi-cylinder motors, to indicate the character of the ignition in the various cylinders.

Taken altogether the progress has been in keeping with the great commercial advances and the great amount of new effort that has enriched the industry since a year ago.

GOOD ROADS AND MOTORING

The good roads work originally planned and pushed by Col. Albert A. Pope, encouraged by the League of American Wheelmen, energetically handled in later days by the National Good Roads Association, has been taken up by the National Association of Automobile Manufacturers. The action is timely and in every way appropriate. Given the same amount of energy as was expended on it between 1880 and 1900, the good roads movement will, in the next 20 years, make such strides as will revolutionize the highway system of the United States and transform a succession of quag-



mires into roads from which pleasure and profit may be derived and of which the country may be proud. In no other country is education so carefully fostered. In no other civilized country are roads so bad, and yet civilization and progress are, supposedly, synonymous.

The work of the pioneers was principally educational. In 1882 New Jersey was no better off than other states. But the education was effective and public interest was aroused to such an extent that the state has now better roads than any other in the country. The New England states and New York have shown satisfactory progress. It was natural that the best work should have been done in the east, and that the west should, as in many things, await the result of the experiments nearer the Atlantic coast.

It is appropriate, therefore, that the N. A. A. M., a new giant supporting the cause, should make its first great effort in the central part of the country. At first the matter was taken up in a mild, milk-and-watery manner, but fortunately the work was delegated to an energetic committee, at whose head is a man who commands one of the most influential channels of communication with the people—one of the great magazines. This committee realized the importance of the work intrusted to it—the duty it owed, not only to the association it represents but to the American people, and forthwith decided on a convention, one of the features of which will be a mass-meeting at



which the conditions will be discussed by the most eminent authorities.

The movement of the N. A. A. M. will, beyond question, find enthusiastic support among automobilists. It shows the desire of the makers to undertake something more than the mere regulation of comparatively small commercial questions and to devote their energy to the furtherance of an undertaking of vital interest to the nation. It is the duty of every man who visits Chicago to lend enthusiasm and encouragement to so worthy an enterprise.

The Paris-Madrid road race, for which the Automobile Club of France is making extensive preparations, has been given the official sanction of the Spanish government. A prominent Spanish automobilist, who is also a member of the Spanish embassy in Paris, has made the following formal announcement:

"I have received a dispatch from Madrid informing me that his majesty the king of Spain has signed the decree authorizing the Paris-Madrid race in Spain."

As the race is yet six months distant this early recognition of the event by the Spanish

government is encouraging, especially in view of the fact that the French automobilists have as yet been unable to secure the official recognition of the race from the French government.

The mayor of Philadelphia has just signed a humorous automobile law. In its original form it provided for a maximum speed of 15 miles in the outskirts. In the busy streets a speed of not more than 5 miles was prescribed when passing another vehicle or rounding a corner. But arguments resulted in the 15-mile provision being expunged. As the matter now stands the 5-mile limit is effective, but only under the conditions mentioned. Under any other circumstances any speed is legal.

The Servian government has granted a French engineer, Alfred Lebert, a 10 years' concession to open automobile transport lines in Servia. He will hold a monopoly in this kind of transport service for passengers and goods. One condition is that lines aggregating 40 miles must be opened during the first year.

The Interstate Transit Co., which has been running automobiles for passenger service over the bridge from St. Louis to East St. Louis, has temporarily suspended the service, which, it promises, will be resumed in the spring.

An automobile was tested successfully over a rural postal route, at Adrian, Mich., last week. The 25½ miles' journey was made in 2 hours and 50 minutes.

GREAT GOOD ROADS MEETING AT CHICAGO

The National Association of Automobile Manufacturers has taken the matter of improved highways in hand with energy and a determination to lend the whole weight and influence of the industry to the cause. Its first important move was to call a convention, at Chicago, opening on February 14 and closing a week later—dates corresponding with those of the Chicago show—in support of the Bromelow bill, soon to be introduced in congress, which provides for an appropriation of \$20,-

000,000 by the national government, to be added to funds raised by states, counties and townships for a national highway. A number of meetings will be held at the assembly room

of the Coliseum and on Friday night a great public meeting is planned. The association has appointed a committee, consisting of John Brisben Walker, J. Wesley Allison and M. J. Budlong, to take charge of the event and the committee is arranging to secure the co-operation of the National Good Roads Association and the National Highway Commission, of which Gen. Roy Stone and Gen. Nelson A. Miles are the respective presidents. The Auditorium has been secured for this meeting.



AMERICAN GASOLINE CARS FOR THE NEW SEASON

The Packard Motor Car Co., Warren, O.—A large single cylinder motor with corrugated sheet metal water jacket, sliding gear transmission and ignition governor are essential features of the Packard chassis, while deep, wide seats, well executed upholstery and a general air of luxurious comfort characterize the exterior. There are no radical departures from the well known Packard construction.

TOURING CAR—Four passengers; weight 2,300 pounds; 12-horsepower motor; one cylinder; 6-inch bore by 6½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed three to one; wheel base 84 inches; track 56½ inches; wheel diameter 34 inches; wheels wood; tires 4-inch Diamond or Goodrich; live rear axle; ball front and roller rear hub bearings; one single and two double acting brakes; sliding gear transmission; speeds on gear 10, 20 and 30 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 11 gallons; water 5 gallons; water circulation by pump and coils; lubrication by mechanical and gravity feeds; radius on one charge 250 miles; price \$2,500.

THE ORIENT

The Waltham Mfg. Co., Waltham, Mass.—A single seat car with plenty of power even for a larger machine, but with a folding front seat for emergencies is the new Orient. The two speed forward and reverse transmission gear furnishes direct drive on the high speed and is controlled by a single lever having the rational movements. The whole machine is durably constructed on the few parts order.

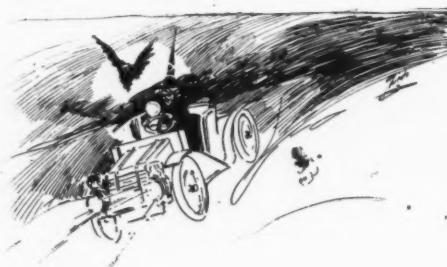
RUNABOUT—Two or four passengers; weight 1,100 pounds; 8-horsepower motor; normal motor speed 1,200 revolutions; one cylinder; 4-inch bore by 4½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed six to one; wheel base 80 inches; track 56 inches; wheel diameter 30 inches; wheels wire; tires 2½-inch International; live rear axle; ball hub bearings; two brakes; planetary gear transmission; chain drive to wheels; lever steering; gasoline tank capacity 5 gallons; water 5 gallons; water circulation by pump; radius on one charge 100 miles; price \$1,000.

THE APPERSON

Apperson Bros., Kokomo, Ind.—Since withdrawing from the Haynes-Apperson Co., Edgar and Elmer Apperson have made rapid progress with their motor-front touring cars and have experienced no difficulty in demonstrating their ability to turn a long line of experience to good account in this style of automobile construction. The Apperson car is made in two sizes of substantially the same general construction.

TOURING CAR—Four passengers; weight 2,500 pounds; 16-horsepower motor; normal motor speed 450 revolutions; two cylinders; 5½-inch bore by 6-inch stroke; make and break spark; magneto and storage battery; speed ratio between

ACCURATE DATA RELATIVE TO THE PRINCIPAL SPECIFICATIONS OF THE DIFFERENT VEHICLES



motor and wheels on fast speed five to two; wheel base 90 inches; track 56 inches; wheel diameter 36 inches; wheels wood; tires 4-inch clincher; live rear axle; roller hub bearings; one foot and two double acting emergency brakes; sliding gear transmission; speeds on gear 6, 12 and 25 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 15 gallons; water 10 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; radius on one charge 200 miles; price \$3,000.

TOURING CAR—Six passengers; weight 2,650 pounds; 20-horsepower motor; 5½-inch bore by 6½-inch stroke; price \$3,500; otherwise same as four passenger model.

THE WARD LEONARD

The Ward Leonard Electric Co., Bronxville, N. Y.—Motor front construction with bevel gear drive in which the transmission is direct on the high speed, and typical tonneau body design render the Ward Leonard touring car a thoroughly up-to-date machine. Great fuel economy is one of the strong claims made relative to its practicability.

TONNEAU—Five passengers; weight 1,550 pounds; 10-horsepower motor; normal motor speed 1,200 revolutions; one cylinder; jump spark; storage battery; wheel base 76 inches; track 47 inches; wheel diameter 30 inches; wheels wood; tires 3½-inch detachable; live rear axle; roller hub bearings; three brakes; speeds on gear 9, 15 and 25 miles an hour; bevel gear drive to wheels; wheel steering; gasoline tank capacity 8 gallons; water 7 gallons; water circulation by thermo-syphon; lubrication by gravity feed; radius on one charge 125 miles; price \$2,250.

TONNEAU—Weight 1,700 pounds; 15-horsepower motor; two cylinders; wheel base 85 inches; track 48 inches; wheel diameter 32 inches; speeds on gear 12, 26 and 33 miles an hour; gasoline capacity 12 gallons; radius on one charge 150 miles; price \$2,650; otherwise same as single cylinder model.

TONNEAU—Weight 1,900 pounds; 24-horsepower motor; four cylinders; wheel base 90 inches; track 51 inches; wheel diameter 34 inches; speeds on gear 16, 27 and 45 miles an hour; gasoline tank capacity 19 gallons; radius on one charge 200 miles; price \$4,500.

The Woodruff Automobile Co., Akron, O.—In addition to the robust runabout brought out last year the Woodruff company is now preparing to market a four passenger touring car with a double opposed cylinder motor under the body. It will have sliding gear transmission with chain drive to the wheels and the essential features of a modern car of this type.

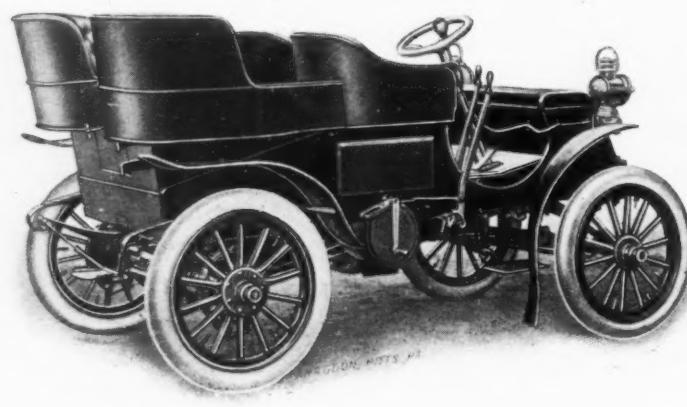
RUNABOUT—Two passengers; weight 1,100 pounds; 6-horsepower motor; normal motor speed 600 revolutions; one cylinder; 5½-inch bore by 6-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed seven to two; wheel base 72 inches; track 56 inches; wheel diameter 28 inches; wheels wood, wire or tubular; tires 2½-inch; live rear axle; ball front, plain rear hub bearings; double acting band brake on rear axle; sliding gear transmission; speeds on gear 8, 15 and 30 miles an hour; chain drive to wheels; wheel or lever steering; gasoline tank capacity 5 gallons; water 4 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge 75 to 150 miles; price \$750.

TOURING CAR—Four passengers; weight 1,800 pounds; 16-horsepower motor; normal motor speed 800 revolutions; two cylinders; speed ratio between motor and wheels on fast speed five to two; wheel base 84 inches; wheel diameter 34 inches; tires 3½-inch clincher; speeds on gear 10, 25 and 45 miles an hour; gasoline tank capacity 12 gallons; water 7 gallons; lubrication by mechanical feed; radius on one charge 100 to 200 miles; price \$1,800; otherwise same as runabout.

THE CENTURY

The Century Motor Vehicle Co., Syracuse, N. Y.—It is claimed for this car that it is under priced in comparison with other machines costing the same; that it is stronger, of more power and of greater touring range than its class companions. The style of body is distinct, being long and with a striking box front providing an extra seat. There is little fine mechanism on the car, the obvious intention of the designers having been to produce a machine that might be easily and safely handled by the novice, one of the numerous carefully considered features in the construction of the carriage is a planetary gear transmission of few parts and durable form which is easily operated and not liable to cause stripping of gears by rough usage.

TOURIST—Two or four passengers; weight 1,200 pounds; 7-horsepower motor; normal motor speed 600 revolutions; one cylinder; 5-inch bore by 6-inch stroke; jump spark; dry battery; speed ratio between motor and wheels on fast speed seven to two; wheel base 72 inches; track 56 inches; wheel diameter 28 inches; wheels wood; tires 3-inch detachable; live rear axle; ball hub bearings; wheel brakes; planetary gear transmission; maximum speed 18 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 7 gallons; water 7 gallons; water circulation by pump and radiating coil; lubrication by



The Packard



The Ward Leonard

gravity feed; radius on one charge 175 miles; price \$700.

THE PEERLESS

The Peerless Motor Car Co., Cleveland, O.—Owing to the performances last summer of a little speed machine facetiously dubbed the "Yellow Kid," there is little if any doubt current relative to the quality of the new Peerless, for the racer was the original of the touring model for this season with a racing body. The Peerless of all American machines looks as though it might have come out of the Paris show, its square bonnet and plural tube radiator being decidedly foreign in accent. The entire machine is trim and neat and while able to comfortably seat five is not heavy nor cumbersome. Notable in the new Peerless is a long wheel base, low center of gravity, throttle governor, lock to prevent stripping gears while shifting them and a jointed steering post.

TOURING CAR—Four or five passengers; weight 1,800 pounds; 16-horsepower motor; normal motor speed 500 revolutions; two cylinders; 4½-inch bore by 5½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed sixty to seventeen; wheel base 84 inches; track 56 inches; wheel diameter 34 inches; wheels wood; tires 3½-inch clincher; stationary rear axle; ball hub bearings; band brakes on wheel and foot brake on transmission shaft; sliding gear transmission; bevel gear drive to wheels; wheel steering; gasoline tank capacity 12 gallons; water 4 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed.

THE BERG

The Berg Automobile Co., New York, N. Y.—The Berg company is busily preparing to fill orders in quantity for two sizes of touring car, one with two cylinder and the other with a four cylinder motor. With the exception that the larger has chain final drives and four speeds while the smaller has bevel gear final drive and three speeds, the two models are similar in construction.

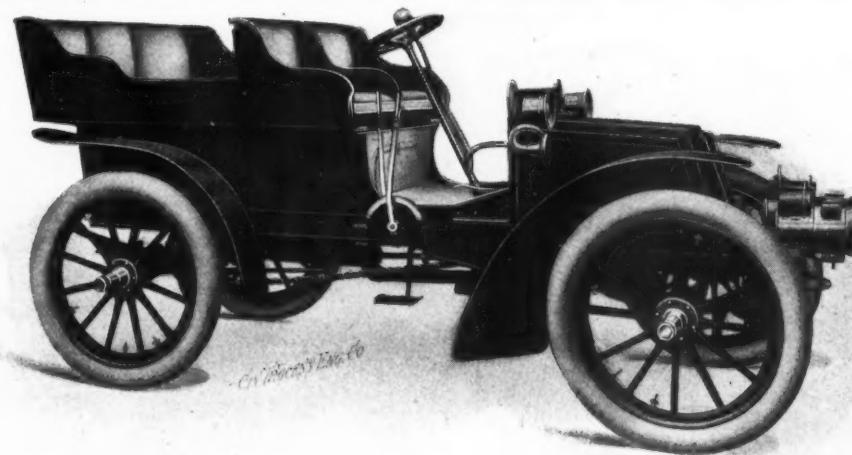
TOURING CAR—Four passengers; weight of chassis 1,500 pounds; 8-horsepower motor; normal motor speed 800 revolutions; two cylinders; jump spark; storage batteries; speed ratio between motor and wheels on fast speed four to one; wheel base 78 inches; track 52 inches; wheel diameter 32 inches; wheels wood; tires 3½-inch; live rear axle; plain hub bearings; two brakes; sliding gear transmission; bevel gear drive to wheels; wheel steering; gasoline tank capacity 9 gallons; water 8 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; radius on one charge 150 miles; price \$2,000.

TOURING CAR—Six passengers; weight of chassis 2,100 pounds; 15-horsepower motor; four cylinders; speed ratio between motor and wheels on fast speed three to one; wheel base 90 inches; track 54 inches; wheel diameter 34 inches; tires 4-inch; stationary rear axle; chain drive to wheels; gasoline tank capacity 12 gallons; water 10 gallons; radius on one charge 200 miles; price of complete chassis \$3,400; otherwise same as four passenger model.

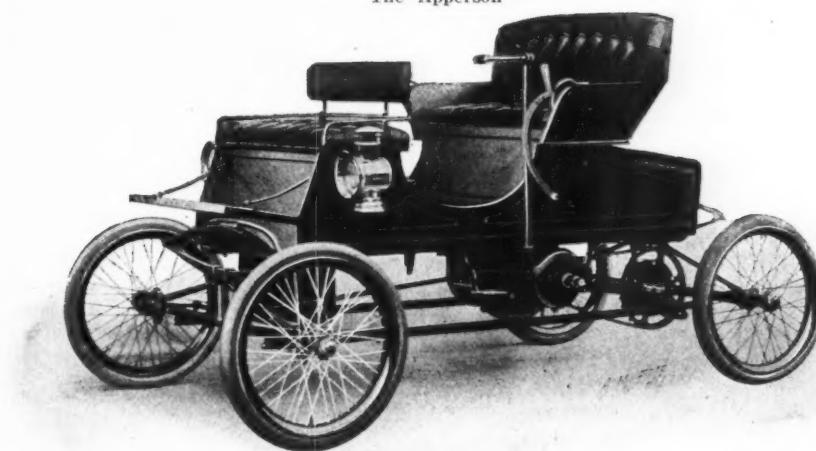
THE NORTHERN

The Northern Mfg. Co., Detroit, Mich.—The designers of this runabout first gave attention to the running gear, with view to making it elastic to provide comfort and stronger than the ordinary light runabout gear to provide a greater degree of security for rough road usage. That the single cylinder motor used is amply strong was well demonstrated by the performance of a stripped Northern at the Detroit race meet where it gave some of the big cars a merry chase. One of the minor improvements is a safety device for automatically producing a late spark when starting that there may be no chance of the ever dangerous back kick of the starting crank.

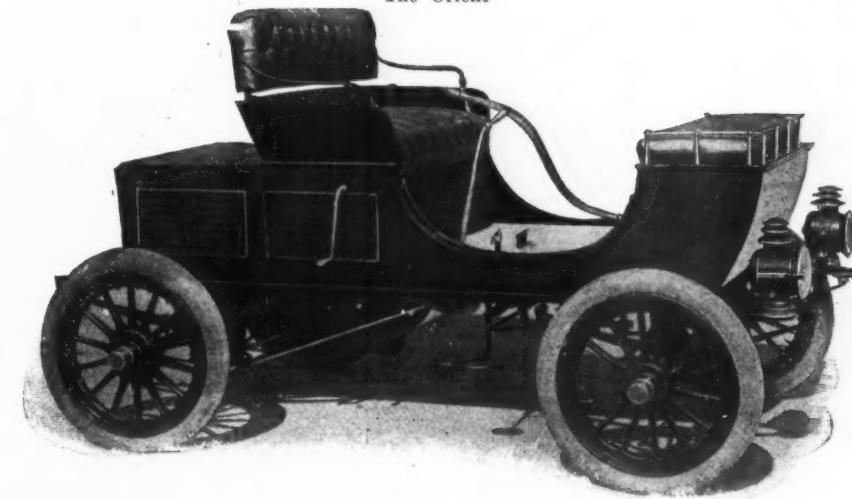
RUNABOUT.—Two passengers; weight 1,600



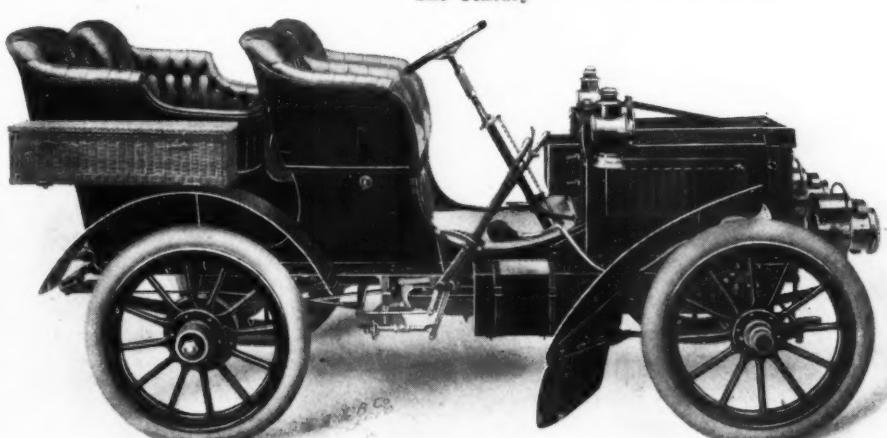
The Apperson



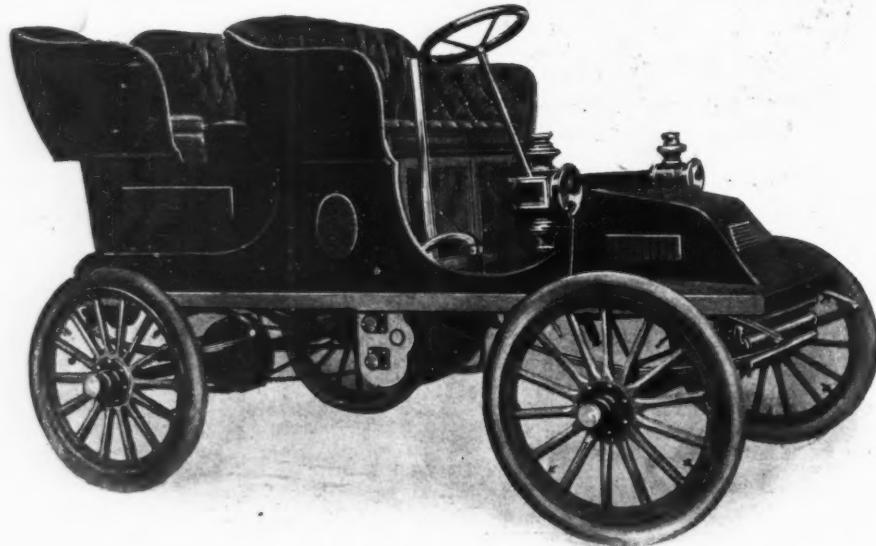
The Orient



The Century



The Peerless



The Hoffman



The Kensington



The Northern

pounds; 5-horsepower motor; normal motor speed 600 revolutions; one cylinder; 4½-inch bore by 6-inch stroke; jump spark; dry battery; speed ratio between motor and wheels on fast speed seven to two; wheel base 68 inches; track 55 inches; wheel diameter 28 inches; wheels wood; tires 2½-inch Dunlop; live rear axle; ball bearing hubs; one brake on transmission and one on differential; planetary gear transmission; maximum speed 25 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 7½ gallons; water 2 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge of gasoline 200 miles, water 80 miles; price \$800.

THE HOFFMAN

The Hoffman Automobile & Mfg. Co., Cleveland, O.—The new Hoffman gasoline car is built for the reception of a tonneau in such a manner that when the latter is removed the carriage presents an extremely light appearance despite its durable construction. The motor and transmission gear are of rather unique construction and the latter, especially is designed to prevent being brought to grief by careless handling. The radius of operation is more than ordinary for a car of its size.

ROADSTER—Two or four passengers; weight 900 pounds; 7-horsepower motor; one cylinder; jump spark; track 56 inches; wheels wire; tires Goodrich or G & J; live rear axles; sliding gear transmission; chain drive to wheels; wheel steering; water circulation by pump and radiating coil; price \$800 without tonneau.

THE KENSINGTON

The Kensington Automobile Mfg. Co., Buffalo, N. Y.—The Kensington touring car has a two cylinder Kelecom motor disposed in front upon a strong steel frame. The drive is by a flexible shaft through a sliding gear transmission to bevel gears on the live, nickel steel rear axle differential. The water radiator has copper ribs. Carburation is by a Longuemare float feed carburetor. All levers and brakes are convenient to operator. The finish is rich, in gold striped claret color with red running gear. Trimmings are all of polished brass.

TONNEAU—Six passengers; weight 1,750 pounds; 12-horsepower motor; normal motor speed 1,800 revolutions; two cylinders; 4-inch bore by 4½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed four to one; wheel base 72 inches; track 56 inches; wheel diameter 28 inches front, 30 inches rear; wheels wood; tires 3 and 3½-inch Dunlop; live rear axle; roller hub bearings; two brakes; sliding gear transmission; maximum speed 37 miles an hour; bevel gear drive to wheels; wheel steering; gasoline tank capacity 8 gallons; water 4 gallons; water circulation by pump and coil; lubrication by mechanical feed; radius on one charge 80 to 100 miles; price \$2,500.

THE LONG DISTANCE

The U. S. Long Distance Automobile Co., New York, N. Y.—Like several other makers of middle weight single seat cars, this metropolitan company has for this season brought out a heavier tonneau touring model of conventional design. The smaller model is changed somewhat in exterior shape also.

RUNABOUT—Two passengers; weight 1,400 pounds; 7-horsepower motor; normal motor speed 700 revolutions; one cylinder; 5-inch bore by 7-inch stroke; make and break spark; dry batteries; speed ratio between motor and wheels on fast speed four to one; wheel base 74 inches; track 56 inches; wheel diameter 30 inches; wheels wood; tires 3-inch Diamond; live rear axle; plain hub bearings; one double acting brake; planetary gear transmission; speeds 4 to 25 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 6 gallons; water 4½ gallons; water circulation by pump and radiating coil; lubrication by pressure from crank case; radius on one charge 125 miles; price \$1,250.

TONNEAU—Four passengers; weight 2,100

pounds; 12-horsepower motor; normal motor speed 500 revolutions; two cylinders; 5-inch bore by 6-inch stroke; speed ratio between motor and wheels on high speed three to one; wheel base 80 inches; tires 3½-inch Diamond; two double acting brakes; speeds 6 to 35 miles an hour; bevel gear drive to wheels; gasoline tank capacity 10 gallons; water 6 gallons; price \$2,500; otherwise same as runabout.

THE GLIDEMOBILE

The Bartholomew Co., Peoria, Ill.—The Glide is a runabout chiefly characterized by its peculiar running gear construction in which great elasticity has been sought. In this system the motor supporting part of the frame is independent of the body carrying member, the provision insuring maintenance of motor and transmission alignment. Other noticeable features are an easily removable body, self-locking steering device preventing backward transmission of road shocks and jarring, and a changeable driving sprocket which allows the gear to be readily changed for runs of different character.

RUNABOUT.—Two or four passengers; weight 1,100 pounds; 6-horsepower motor; motor speed 230 to 1,400 revolutions; one cylinder; 5-inch bore by 6-inch stroke; jump spark; magneto and dry battery; speed ratio between motor and wheels on high speed seven to two; wheel base 70 inches; track 55 inches; wheel diameter 32 inches; wheels wood or wire; tires 3-inch Diamond; live rear axle; ball and roller hub bearings; three band brakes; planetary gear transmission; speeds on gear two forward and reverse; chain drive to wheels; self locking lever steering; gasoline tank capacity 4 gallons; water 6 gallons; water circulation by pump; lubrication by gravity; radius on one charge 100 miles; price \$750.

THE REBER

The Reber Mfg. Co., Reading, Pa.—The Reber touring car and the Reber Mfg. Co. are both new to the trade. But the latter is under the management of J. C. Reber, who for years managed the old Acme bicycle plant closed by the A. B. C., while the car is built in that same shop under designs by James G. Heaslet, formerly with the Autocar Co.

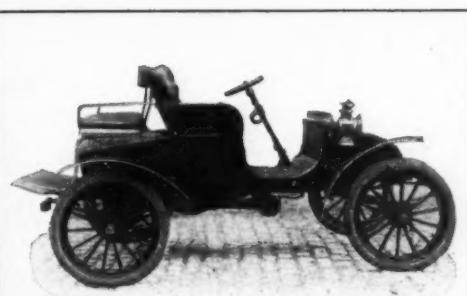
TONNEAU—Four passengers; weight 1,650 pounds; 12-horsepower motor; normal motor speed 1,000 revolutions; two cylinders; wheel base 78 inches; track 54 inches; wheel diameter 30 inches; wheels wood; stationary rear axle; ball hub bearings; double acting differential and wheel brakes; sliding gear transmission; chain drive to wheels; wheel steering; water circulation by pump and radiating coil.

THE SPAULDING

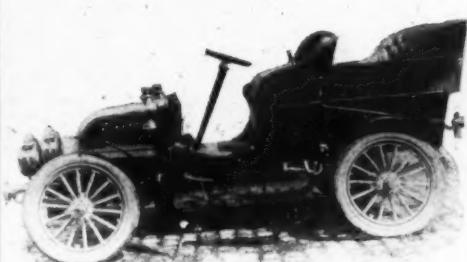
The Spaulding Automobile & Motor Co., Buffalo, N. Y.—This Buffalo company is still another maker whose first success was builded upon a light road wagon or runabout that has taken advantage of the present great demand for touring cars to strike out into wider fields. The runabout remains an improved pattern of the car of last year and having the same general appearance. The touring car is high powered although comparatively light.

RUNABOUT.—Two passengers; weight 950 pounds; 6-horsepower motor; normal motor speed 900 revolutions; one cylinder; 4½-inch bore by 6-inch stroke; jump spark; dry battery; 56-inch track; wheel diameter 28 inches; wheels tubular; tires 2½ inches; live rear axle; roller hub bearings; two band brakes; planetary gear transmission; chain drive to wheels; lever steering; gasoline tank capacity 6 gallons; water 5 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; price \$700.

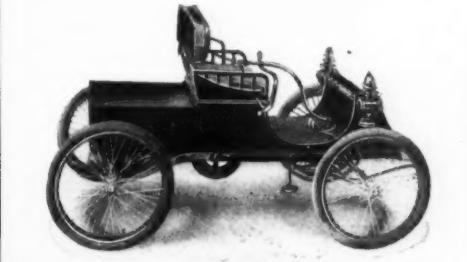
TOURING CAR.—Four passengers; weight 1,500 pounds; 25-horsepower motor; normal motor speed 2,000 revolutions; two cylinders; 5-inch bore by 4½-inch stroke; wheel diameter 30 inches; wheels wood; tires 3½ inches; stationary rear axle; plain hub bearings; three band brakes; sliding gear transmission; wheel steering; gasoline tank capacity 12 gallons; water 10 gallons; radius



The Long Distance Runabout



The Long Distance Touring Car



The Glide



The Reber



The Crest.



The Cadillac

on one charge 200 miles; price \$1,750; otherwise same as runabout.

THE CADILLAC

The Cadillac Automobile Co., Detroit, Mich.—The Cadillac represents a new style of automobile—a runabout or single seat wagon strong and powerful enough to allow the attachment of a tonneau and the carrying of two extra passengers over average roads. The whole system of construction implies as few parts as possible with an easily manipulated method of control.

RUNABOUT.—Two or four passengers; weight 1,200 pounds; 6-horsepower motor; normal motor speed 800 revolutions; one cylinder; 5-inch bore by 5-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed three to one; wheel base 72 inches; track 56 inches; wheel diameter 28 inches; wheels wood; tires 3-inch Hartford or Fisk; live rear axle; ball hub bearings; two brakes; planetary gear transmission; maximum speed 30 miles an hour; chain drive to wheels; wheel steer gasoline tank capacity 6 gallons; water 6 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius one charge 150 miles; price \$750.

THE CRESTMOBILE

The Crest Mfg. Co., Cambridge, Mass.—An air cooled vertical motor hung on the extreme front end of the frame and as simple an outfit of appurtenances as found on a motor bicycle characterize the Crestmobile. The attachment of the body on the springs is entirely independent of the motor. In a new model preparing a French style bonnet will enclose the motor and a reverse drive will be added. Final transmission will also be by a shaft instead of chain.

RUNABOUT.—Two passengers; weight 550 pounds; 3½-horsepower air cooled motor; normal motor speed 1,200 revolutions; one cylinder; 3½-inch bore by 3½-inch stroke; jump spark; dry batteries; wheel base 57 inches; track 45 inches; wheel diameter 28 inches; wheels wire; tires 2-inch Dunlop; stationary rear axle; ball hub bearings; one band brake; clutch and sprocket transmission; speeds on clutch 8 and 25 miles an hour; chain drive to wheels; gasoline tank capacity 3½ gallons; lubrication by gravity feed; radius on one charge 100 miles; price \$550.

THE COLUMBIA

The Electric Vehicle Co., Hartford, Conn.—This maker of elegant electric equipages has for the new year a gasoline car of the approved "big" type—20-horsepower, four cylinder upright motor in front, magneto ignition, four speed sliding gear transmission, tonneau body, etc.

TONNEAU.—Five passengers; weight 2,700 pounds; 20-horsepower motor; normal motor speed 800 revolutions; four cylinders; 5-inch bore by 5-inch stroke; jump spark; magneto; speed ratio between motor and wheels on fast speed three to one; wheel base 93 inches; track 56 inches; wheel diameter 34 inches; wheels wood; tires 3½ or 4-inch, Diamond Continental type; stationary rear axle; plain hub bearings; four double acting band brakes; sliding gear transmission; four speeds forward and reverse; chain drive to wheels; wheel steering; gasoline tank capacity 12 gallons; water 6 gallons; water circulation by pump and radiating coil; lubrication by forced sight feed; radius on one charge 150 miles.

THE ROBINSON

The Pope-Robinson Co., Hyde Park, Mass.—The Robinson is an edition de luxe of the American touring car, being furnished with all of the conveniences and comfort yielding appurtenances now held in favor. It is a four cylinder motor front machine with the power plant and body on a heavy channel steel frame. Its regular equipment includes canopy top, side curtains and "let down" glass front,

side and golf baskets. The finish is high and in good taste.

TOURING CAR.—Four to six passengers; weight 3,000 pounds with canopy top; 24-horsepower motor; normal motor speed 900 revolutions; four cylinders; 4-inch bore by 6-inch stroke; wiper spark; storage battery and magneto; speed ratio between motor and wheels on high speed two and one-half to one; wheel base 81 inches; track 54 inches; wheel diameter 34 inches; wheels wood; tires 4½-inch rear and 4-inch front, Goodrich detachable; stationary rear axle; plain hub bearings; one brake on gear shaft and two on wheels; spur gear clutch transmission; speeds on gears 5, 15 and 40 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 15 gallons; water 6 gallons; water circulation by pump and radiating coils; radius on one charge 150 miles.

THE SPEEDWELL

The Speedwell Automobile Co., Milwaukee, Wis.—A strong, roomy runabout, the Speedwell has such popular features as two speed and reverse planetary gear controlled by a single lever; foot controlled throttle, combined with ignition timer; float feed carburetor; angle iron rectangular frame, and removable body. A special feature is the large size of the wheels.

RUNABOUT—Two passengers; weight 1,200 pounds; 8-horsepower motor; normal motor speed 800 revolutions; two cylinders; 4½-inch bore by 4½-inch stroke; jump spark; wheel base 68 inches; track 56 inches; wheel diameter 32 inches; wheels tubular artillery; tires 3-inch Diamond; live rear axle; roller hub bearings; planetary gear transmission; wheel steering; gasoline tank capacity 5 gallons; water 8 gallons; water circulation by pump and coil; lubrication by mechanical feed; radius on one charge 100 to 150 miles; price \$1,000.

THE STEARNS

The F. B. Stearns Co., Cleveland, O.—The Stearns company offers two cars both strong and powerful and both calculated to stand hard knocks. One is the big 25-horsepower touring car marked by a double cylinder horizontal motor under the body, said to be a pattern of quietness in running. The Suburban model, as the other is termed, is of single cylinder construction. It is capable of seating four passengers.

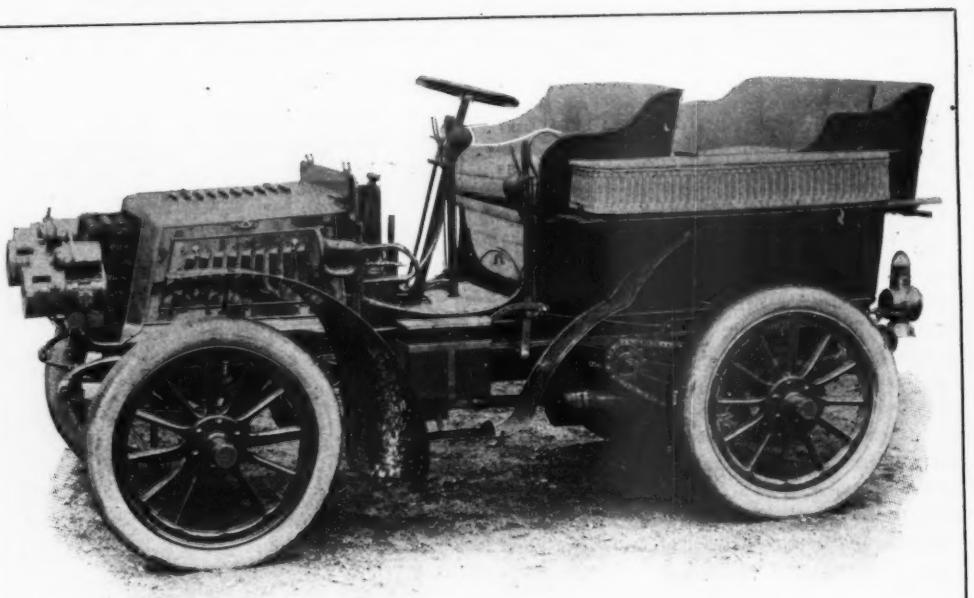
TOURING CAR.—Six passengers; weight 2,400 pounds; 25-horsepower motor; normal motor speed, 800 revolutions; two cylinders; 5½-inch bore by 6½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed two to one; wheel base 96 inches; track 56 inches; wheel diameter 34 inches; wheels wood; tires 4-inch; live rear axle; ball hub bearings; two brakes; sliding gear transmission; speeds on gear 5, 25 and 40 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 20 gallons; water 10 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; radius on one charge 200 miles; price \$3,000.

SUBURBAN.—Four passengers; weight 1,900 pounds; 12-horsepower motor; normal motor speed 600 revolutions; one cylinder; 6½-inch bore by 7-inch stroke; speed ratio between motor and wheels on fast speed five to two; wheel diameter 32 inches; tires 3½-inch; direct clutch transmission; speeds 3 to 30 miles an hour; gasoline tank capacity 13 gallons; radius on one charge 150 miles; price \$2,000; otherwise same as touring car.

THE BRAZIER

H. Bartol Brazier, Philadelphia, Pa.—Mr. Brazier is a builder of large and elegant cars for comfortable suburban use and touring. He deserves credit for being one of the first makers in this country to produce covered cars of the limousine pattern. It is noticeable in the Brazier car that the different controlling mediums are grouped on the steering post.

TONNEAU.—Six passengers; weight 2,650 pounds; 15-horsepower motor; normal motor speed



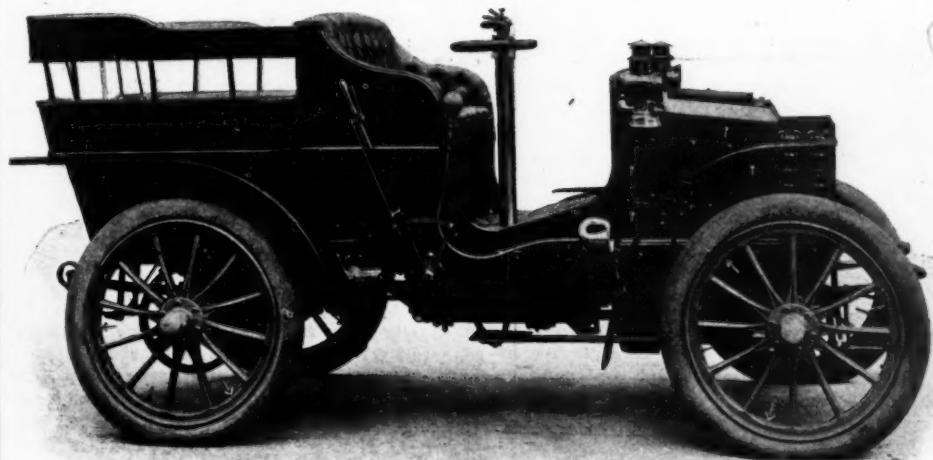
The Robinson



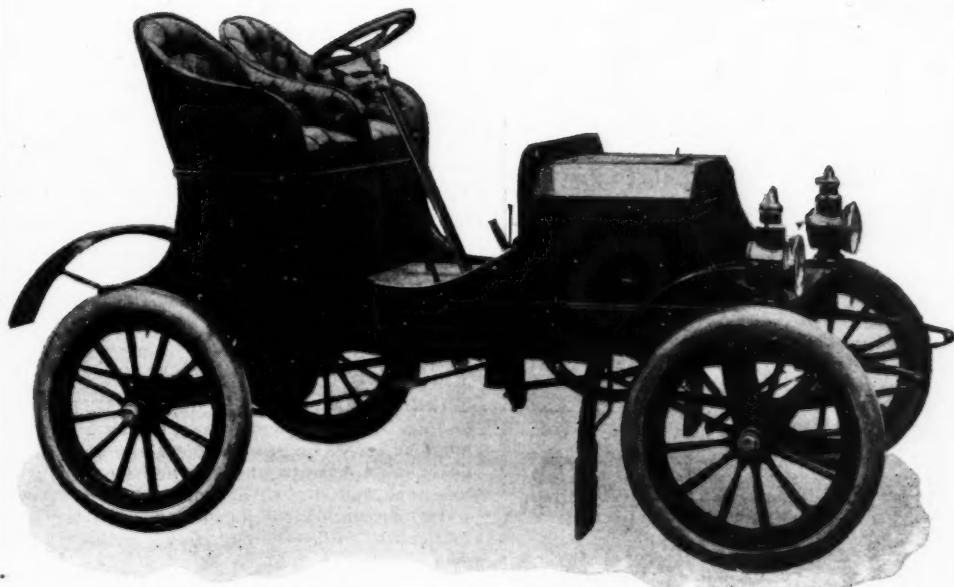
The Speedwell



The Stearns



The Brazier



The Franklin



The Pierce Touring Car

800 revolutions; two cylinders; 5-inch bore by 6-inch stroke; jump spark; generator and dry battery; speed ratio between motor and wheels on high speed four to one; wheel base 85 inches; track 52 inches; wheel diameter 36 inches; wheels wood; tires 4-inch Goodrich detachable; live rear axle; roller hub bearings; two brakes; sliding clutch gear transmission, always in mesh, direct on high speed; speeds on gear 5, 14 and 22 miles an hour; bevel gear drive to wheels; wheel steering; gasoline tank capacity 14 gallons; water 6 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; radius on one charge 125 miles; price \$3,000.

THE FRANKLIN

The H. H. Franklin Mfg. Co., Syracuse, N. Y.—The Franklin belongs in a class of its own. It is the sole representative of construction embracing a four air cooled cylinder motor. This motor is located on the front end of the frame and its shaft is parallel with the wheel axles. The fly wheel is at one end of the crank case while upon the other is the entire transmission gear, from which the drive is direct to the rear axle by sprockets and chain.

LIGHT ROADSTER—Two passengers; weight 1,100 pounds; 10-horsepower air cooled motor; normal motor speed 1,000 revolutions; four cylinders; 3 1/4-inch bore by 3 1/4-inch stroke; jump spark; generator and storage battery; speed ratio between motor and wheels on fast speed four to one; wheel base 72 inches; track 54 inches; wheel diameter 28 inches; wheels wood or wire; tires 3-inch detachable; live rear axle; ball hub bearings; two brakes; planetary gear transmission; speed 2 to 30 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 7 gallons; lubrication by mechanical feed; radius on one charge 150 miles; price \$1,250 to \$1,300.

THE PIERCE

The George N. Pierce Co., Buffalo, N. Y.—The Pierce motorette in its new form is supplemented by a moderate size tonneau machine of approved lines called the Arrow. The former is much the same as the preceding model which made such astonishing runs in several endurance tests while the latter is in every respect a typical strong car for fast rough road work.

RUNABOUT—Two passengers; weight 900 pounds; 6 1/2-horsepower motor; normal motor speed 1,200 revolutions; one cylinder; 3 9/16-inch bore by 4 1/2-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on high speed fifteen to two; wheel base 70 inches; track 52 inches; wheels diameter 28 inches; wheels wood; tires 3-inch G & J; live rear axle; ball hub bearings; hub brakes; planetary gear transmission; speeds on gear 7 and 22 miles an hour; direct spur gear drive to wheels; lever steering; water tank capacity 6 gallons; water circulation natural with radiating coil; lubrication by pump; radius on one charge 120 miles; price \$1,200.

TONNEAU—Four passengers; weight 1,600 pounds; 15-horsepower motor; normal motor speed 900 revolutions; two cylinders; 4-inch bore by 4 1/2-inch stroke; speed ratio between motor and wheels on fast speed nine to two; wheel base 81 inches; wheel diameter 32 inches; tires 3 1/2-inch Goodrich detachable; two hub and a countershaft brake; sliding gear transmission; speeds on gear 7, 15 and 30 miles an hour; bevel gear drive to wheels; wheel steer; gasoline tank capacity 8 gallons; water circulation by pump and radiating coils; radius on one charge 150 miles; price \$2,500; otherwise same as runabout.

THE ST. LOUIS

The St. Louis Motor Carriage Co., St. Louis, Mo.—In both its touring car and Boston pattern runabout the St. Louis company has paid special attention to the transmission. One feature in this connection is a locking device which prevents power being applied until the gears are properly shifted, rendering gear stripping impossible. In the runabout, which, incidentally is one of the very few cars of its class equipped with sliding gear transmission,



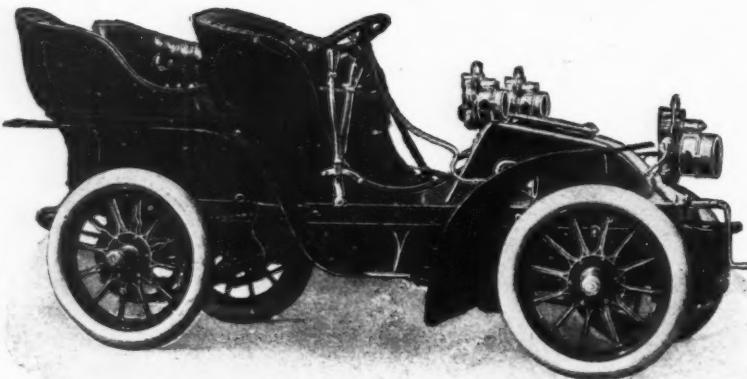
The St. Louis Touring Car



The St. Louis Runabout



The American C. G. V.



The Three Cylinder Toledo

the gears are enclosed in the crank chamber, with the whole mechanism bolted directly to the cylinder. The accessibility of all parts is a point upon which particular stress is laid.

RUNABOUT—Two passengers; weight 1,400 pounds; 8-horsepower motor; normal motor speed 600 revolutions; one cylinder; 5½-inch bore by 6-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on high speed three to one; wheel base 72 inches; track 52 inches; wheel diameter 32 inches; wheels wood, wire or tubular; tires 3-inch detachable; live rear axle; ball front and roller rear hub bearings; two wood shoe double acting brakes; sliding gear transmission; speed 25 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 8 gallons; water 3 gallons; water circulation by pump and radiating coils; lubrication by gravity feed; radius on one charge 160 miles; price \$1,500; otherwise same as runabout.

TONNEAU—Four passengers; weight 1,600 pounds; normal motor speed 750 revolutions; speed ratio between motor and wheels on fast speed, seven to two; wheel base 84 inches; tires 3½-inch detachable; roller hub bearings; speed 5 to 30 miles an hour; gasoline tank capacity 10 gallons; water circulation by gravity and radiating coil; radius on one charge 200 miles; price \$1,500.

THE AMERICAN C. G. V.

Smith & Mabley, New York, N. Y.—While this firm has been most commonly identified with the importation of such prominent French cars as the Panhard, Peugeot and Renault, it is now perhaps best known as the distributor of the American made Charron, Girardot & Voight car. This is put up at Rome, N. Y., and is built on the same lines and under the same patents as the well known French C. G. V. car. The new pattern is not greatly different from that of last season the chief changes being improvements in detail.

TONNEAU—Four passengers; weight 2,800 pounds; 15-horsepower motor; normal motor speed 800 revolutions; four cylinders; 3½-inch bore by 5½-inch stroke; jump spark; storage battery; wheel base 84 inches; track 54 inches; wheel diameter 36 inches; wheels wood; 90-millimeter Michelin tires; stationary rear axle; ball hub bearings; foot and hand brakes; sliding gear transmission; speeds on gear 8, 15, 22 and 35 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 15 gallons; water 8 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; radius on one charge 200 miles.

THE FREDONIA

The Fredonia Mfg. Co., Youngstown, O.—This is one of the several successful runabouts which appeared last season. It is of the approved general style of construction for such cars with a motor of greater than ordinary size and power. The entire construction is substantial and plain, filigree having been left out of its production.

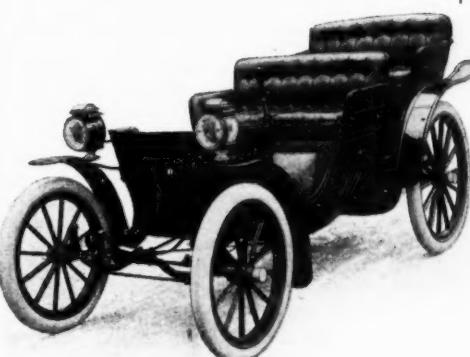
RUNABOUT—Two passengers; weight 1,300 pounds; 9-horsepower motor; normal motor speed 600 revolutions; one cylinder; 5½-inch bore by 6½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed three to one; wheel base 72 inches; track 56 inches; wheel diameter 32 inches; wheels wood; tires 3-inch Goodrich; live rear axle; roller hub bearings; two brakes; planetary gear transmission; speed 6 to 30 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 8 gallons; water 3 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge 150 miles; price \$1,000.

THE TOLEDO

The International Motor Car Co., Toledo, O.—The Toledo gasoline touring car was a quick seller from the start, its body, shape and general design being a pattern worthy of honest praise. In brief it represented European design remolded by the American process of refinement, the angles and poor proportions hav-



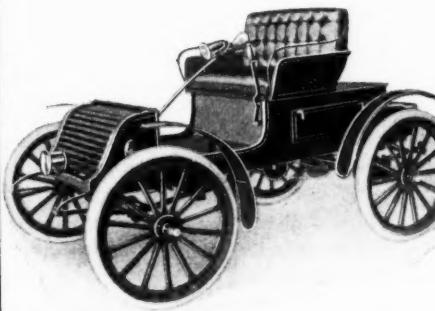
The Fredonia



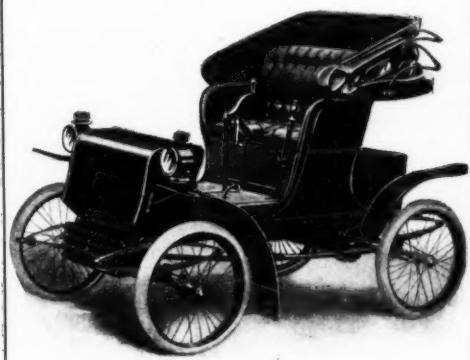
The Duryea Surrey



The Rambler



The Friedman



The Stevens

ing been replaced by curves and well balanced construction. The car is further notable as the only American machine with a three cylinder vertical motor in front. Two new models, one with a two and the other with a four cylinder motor are also offered.

TOURING CAR—Four passengers; weight 2,600 pounds; 18-horsepower motor; normal motor speed 900 revolutions; three cylinders; 4½-inch bore by 5¼-inch stroke; jump spark; dynamo and storage battery; speed ratio between motor and wheels on fast speed three to one; wheel base 84 inches; track 54 inches; wheel diameter 32 inches; wheels wood; tires 4-inch G & J; stationary rear axle; ball hub bearings; brakes on wheels and on counter shaft; sliding gear transmission; speeds on gear 6, 16 and 30 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 16 gallons; water 8 gallons; water circulation by pump and radiating coil; lubrication by mechanical feed; radius on one charge 150 miles; price \$3,000.

THE DURYEA

The Duryea Power Co., Reading, Pa.—To say that the Duryea line for 1903 would be complete without the three wheeler which has made C. E. Duryea famous while he has been trying to make it famous, would be to impeach Mr. Duryea for the greatest crime he knows—inconstancy. The three wheeler is still on deck; likewise the single lever control which has become a strong characteristic of Duryea construction. The three cylinder inclined motor under the seat with planetary speed gears is used in all of the various patterns built. Comfort in riding and a simple mechanism to care for are initial items in the Duryea list of advantages.

PHAETON—Two passengers; weight 800 pounds; 10-horsepower motor; normal motor speed 1,000 revolutions; three cylinders; 4½-inch bore by 4½-inch stroke; hammer break spark; magneto; speed ratio between motor and wheels on fast speed eleven to three; wheel base 69 inches; track 56 inches; wheel diameters 30 inches front and 36 inches rear; wheels wood; tires 3-inch Dunlop detachable; live rear axle; plain hub bearings; one brake on differential; planetary gear transmission; speed on gear 6 and 25 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 7 gallons; water 9 gallons; water circulation by gravity; lubrication by gravity; radius one charge 100 to 150 miles; price \$1,350.

SURREY—Four passengers; weight 950 pounds; speed ratio between motor and wheels on high speed thirty-three to eight; wheel base 84 inches; gasoline tank capacity 10 gallons; water 15 gallons; price \$1,750; otherwise same as phaeton.

THE RAMBLER

Thomas B. Jeffery & Co., Kenosha, Wis.—The Rambler represents the same general system of construction as employed successfully last year, but the car is slightly heavier, with a longer wheel base, somewhat larger motor, artillery pattern wheels, sloping rear body, lower center of gravity and a more rakish front end bonnet. The same pumpless water circulating system is employed.

RUNABOUT—Two passengers; weight 1,200 pounds; 6-horsepower motor; normal motor speed 800 revolutions; one cylinder; 5-inch bore by 6 inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed thirty-seven to ten; wheel base 78 inches; track 56½ inches; wheel diameter 28 inches; wheels wood; tires 3-inch Diamond; live rear axle; ball front and roller rear hub bearings; brakes on hub drums and on transmission; planetary gear transmission; speed 3 to 20 miles an hour; chain drive to wheels; transverse lever steering; gasoline tank capacity 6 gallons; water 4 gallons; water circulation natural; lubrication by gravity feed; radius on one charge of gasoline 150 miles, water 200 miles; price \$750.

THE STEVENS-DURYEA

The J. Stevens Arms & Tool Co., Chicopee Falls, Mass.—This car was brought rapidly to

prominence by its creditable performance in the recent 500-mile reliability test, in which it secured a first-class certificate. The machine is partially characterized by a slow speed double cylinder motor for which with its heavy fly wheel reduced vibration and less wear on running parts is claimed.

RUNABOUT—Two passengers; weight 1,050 pounds; 7-horsepower motor; normal motor speed 450 revolutions; two cylinders; 4½-inch bore by 4½-inch stroke; jump spark; dry battery; speed ratio between motor and wheels on fast speed twenty-three to ten; wheel base 69 inches; track 54 inches; wheel diameter 28 inches; wheels wood or wire; tires 3-inch Fisk or Diamond; live rear axle; ball hub bearings; one brake; spur gear clutch transmission; speeds on gear 5, 11 and 16 miles an hour; maximum speed 30 miles an hour; chain drive to wheels; side lever steering; gasoline tank capacity 6 gallons; water 5 gallons; water circulation by pump and coils; lubrication by gravity feed; radius on one charge 100 to 125 miles; price \$1,200.

THE FRIEDMAN

The Friedman Automobile Co., Chicago, Ill.—Roller and disk friction transmission has been always coupled with the name Friedman. The 1903 road wagon is similar in general appearance to that of last year and with the same broad style of construction. Detail improvements have been made and the quantity production of the cars at the factory has been put on a better basis. The company is also preparing to introduce a motor front surrey.

ROAD WAGON—Two passengers; weight 980 pounds; 6-horsepower motor; normal motor speed 1,000 revolutions; two cylinders; 3½-inch bore by 4-inch stroke; jump spark; storage batteries; speed ratio between motor and wheels on fast speed four to one; wheel base 62 inches; track 56 inches; wheel diameter 30 inches; wheels wood; tires 3-inch Diamond; live rear axle; plain hub bearings; single band brake; variable speed friction transmission; maximum speed 25 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 6 gallons; water 6 gallons; water circulation by pump; lubrication by mechanical feed; radius on one charge 75 to 125 miles; price \$750.

THE ELMORE

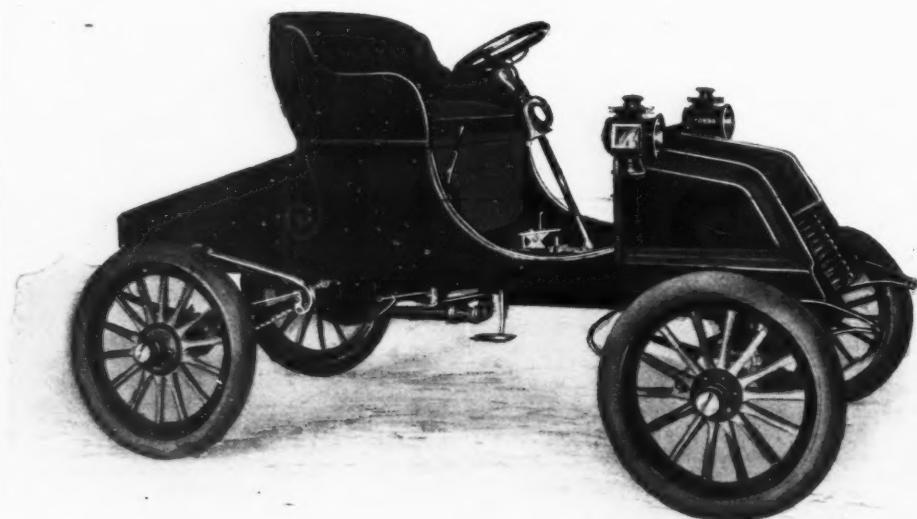
The Elmore Mfg. Co., Clyde, O.—The Elmore company is probably the only company in this country using the two cycle motor in an automobile. Despite the minority of its position, however, the service rendered by the car seems to fully warrant the maker's claims concerning the efficiency and economy of the two cycle motor. In addition to the runabout the Elmore company has for this year a two cylinder motor touring car with detachable tonneau.

RUNABOUT—Two passengers; weight 1,200 pounds; 6-horsepower motor; normal motor speed 600 revolutions; two cylinders; 4-inch bore by 4-inch stroke; make and break spark; generator and storage battery; speed ratio between motor and wheels on high speed ten to three; wheel base 66 inches; track 56 inches; wheel diameter 28 inches; wheels wood; tires 3-inch; live rear axle; ball and roller hub axles; band brakes; planetary gear transmission; speed on gear 7½, 10 and 25 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 8 gallons; water 4 gallons; water circulation by pump and radiating coil; lubrication by gravity; radius on one charge 150 miles; price \$800.

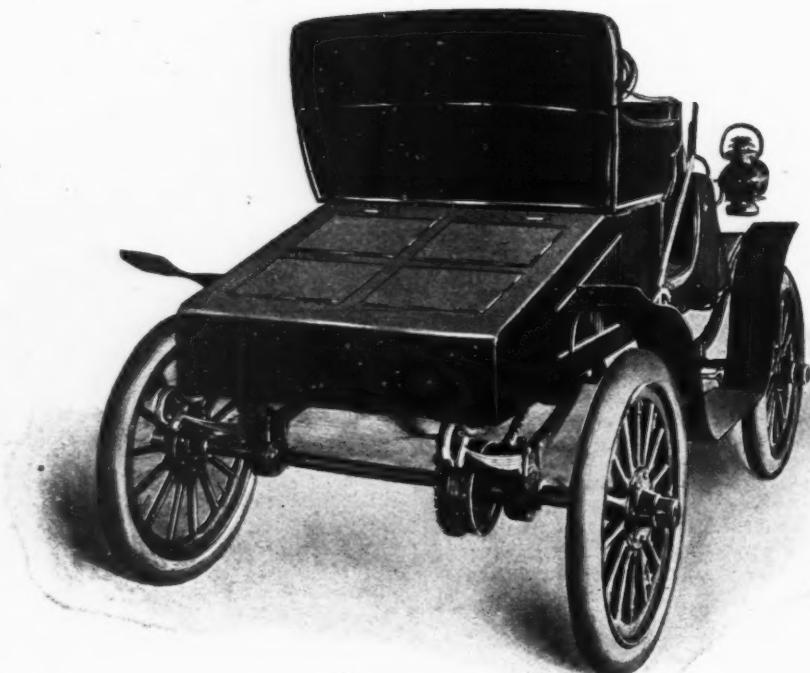
TOURING CAR—Four passengers; weight 1,450 pounds; 10-horsepower motor; normal motor speed 960 revolutions; wheel base 77 inches; wheel diameter 30 inches; speeds on gear 10, 14 and 30 miles an hour; gasoline tank capacity 10 gallons; price \$1,400; otherwise same as runabout.

THE GENERAL

The General Automobile & Mfg. Co., Cleveland, O.—While its new runabout pattern, which is of that new style called moderate size for want of a better name, is supplied when



The General



The Shelby



The Locomobile

desired with a detachable tonneau to accommodate two extra passengers, the General company has introduced a heavier touring car with a double cylinder motor. This has a three speed and reverse sliding gear transmission and is a strong durable car.

RUNABOUT—Two and four passengers; weight 1,200 pounds; 8-horsepower motor; normal motor speed 950 revolutions; two cylinders; 4-inch bore by 4½-inch stroke; jump spark; dry battery; speed ratio between motor and wheels on fast speed, three to one; wheel base 78 inches; track 56 inches; wheel diameter 28 inches; wheels artillery tubular; tires 3-inch detachable; live rear axle; roller hub bearings; two brakes; planetary gear transmission; speeds on gear 2 to 10 and 6 to 30 miles an hour; chain drive to wheels; gasoline tank capacity 7½ gallons; water 4½ gallons; water circulation by pump; lubrication by mechanical feed; radius on one charge 125 miles; price \$900.

TOURING CAR—Four passengers; weight 1,650 pounds; 14-horsepower motor; normal motor speed 750 revolutions; 4½-inch bore by 6-inch stroke; speed ratio between motor and wheels on fast speed five to two; wheel base 84 inches; wheel diameter 30 inches; stationary rear axle; sliding gear transmission; speeds on gear 10, 20 and 35 miles an hour; gasoline tank capacity 12 gallons; water 8 gallons; thermal water circulation; radius on one charge 160 miles; price \$1,600 to \$2,000; otherwise same as runabout.

THE SHELBY

The Shelby Motor Car Co., Shelby, O.—All of the several patterns of this make, formerly known as the Darling, are characterized by motors having two oppositely but simultaneously working pistons in each cylinder. The cars are strong and substantially built and have comfortable and roomy bodies and seats.

COMBINATION—Two or four passengers; weight 1,500 pounds; 10-horsepower motor; normal motor speed 600 revolutions; one two-piston cylinder; 6½-inch bore by 10-inch aggregate stroke; jump spark; dry batteries; wheel base 78 inches; track 56 inches; wheel diameter 32 inches; wheels wood or wire; tires 3½-inch Goodrich clincher; live rear axle; ball front and roller rear hub bearings; two brakes; planetary gear transmission; speeds on gear 4, 12 and 25 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 8 gallons; water 5 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge 150 miles; price \$1,200.

TOURING CAR—Six passengers; weight 1,800 pounds; 20-horsepower motor; two cylinders; wheel base 93 inches; tires 4-inch Goodrich detachable; speeds on gear 5, 15 and 35 miles an hour; gasoline tank capacity 10 gallons; water 8 gallons; price \$2,500; otherwise same as combination model.

THE LOCOMOBILE

The Locomobile Co. of America, New York.—The two gasoline touring cars recently brought out by the Locomobile company are typical representatives of the most modern adaptation of the now popular motor front, tonneau body construction. One with a four cylinder and the other with a two cylinder motor they are otherwise substantially the same in general lines and principle of construction. Both are noted for many refinements in the matter of detail and finish. The Locomobile company has evidently experimented long in order to be sure of its ground when making its debut into the gasoline field.

TONNEAU—Five passengers; weight 2,100 pounds; 12-horsepower motor; normal motor speed 900 revolutions; four cylinders; 4-inch bore by 5-inch stroke; jump spark; storage battery and dynamo; speed ratio between motor and wheels on fast speed three to one; wheel base 82 inches; track 51 inches; wheel diameter 34 inches; wheels wood; tires 3½-inch clincher; stationary rear axle; plain hub bearings; one differential and two hub brakes; sliding gear transmission; maximum speed 40 miles an hour; chain drive to

wheels; wheel steering; gasoline tank capacity 15 gallons; water 7 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; price of chassis \$3,200.

THE KNOX

The Knox Automobile Co., Springfield, Mass. The Knox is waterless, as ever, with the same pin radiator air cooled motor. The new pattern is somewhat larger and with a more powerful motor than the 1902 pattern and of longer wheel base. The folding front seat is larger and more comfortable and the gasoline tank is also larger. The wheels have roller bearings.

RUNABOUT—Two or four passengers; weight 1,600 pounds; 8-horsepower air cooled motor; normal motor speed 700 revolutions; one cylinder; 5-inch stroke by 8-inch bore; jump spark; dry batteries; speed ratio between motor and wheels on fast speed three to one; wheel base 72 inches; track 54 inches; wheel diameter 30 inches; wheels wood; tires 3½-inch Diamond; live rear axle; roller hub bearings; two foot and one hand brake; planetary gear transmission; maximum speed 30 miles an hour; chain drive to wheels; gasoline tank capacity 12 gallons; lubrication by mechanical feed; radius on one charge 150 miles; price \$1,200.

THE WINTON

The Winton Motor Carriage Co., Cleveland, O.—The well known Cleveland company follows its plan of last year to market but one model—that a touring car de luxe upon which all energies can be bent—both mechanically and commercially. The new Winton has a larger motor than formerly, larger tanks and roomier, higher and more comfortable seats. All improvements have aimed at increasing its serviceability and at lending it a general air of superior quality. Detail improvements are numerous, although there are no radical changes in the layout of the chassis.

TOURING CAR—Five passengers; weight 2,100 pounds; 20-horsepower motor; two cylinders; jump spark; dry battery; wheel base 90 inches; track 56 inches; wheel diameter 32 inches; wheels wood; tires 4-inch Goodrich; live rear axle; ball front, rear roller hub bearings; four brakes; maximum speed 40 miles an hour; chain drive to wheels; wheel steering; gasoline tank capacity 12 gallons; water 10 gallons; water circulation by pump and radiating coil; lubrication by gravity feed and splash; radius on one charge 150 to 225 miles; price \$2,500.

THE UNION

The Union Automobile Co., Union City, Ind.—This is another of the type of car growing rapidly in popularity in this country—a strong, durable single seat machine easily convertible into a four passenger rig. The supplementary seat, however, instead of being of the tonneau type now generally applied to gasoline cars, is of the folding front variety which has been a feature of many steam vehicles. The spark timing mechanism is controlled by an attachment on the speed change lever. Friction drive of the roller and disk type in which the fly wheel constitutes the disk is the particular feature of the chassis.

RUNABOUT—Four passengers; weight 1,800 pounds; 8-horsepower motor; normal motor speed 800 revolutions; two cylinders; 6-inch bore by 6-inch stroke; make and break or jump spark; dynamo and dry batteries; wheel base 72 inches; track 56 inches; wheel diameter 34 inches; wheels tubular; tires 3½-inch Dunlop; live rear axle; roller hub bearings; variable speed friction transmission; maximum speed 20 miles an hour; lever steering; gasoline tank capacity 10 gallons; water 12 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge 100 to 150 miles; price \$1,250.

THE OLDSMOBILE

The Olds Motor Works, Detroit, Mich.—There is little new in the Oldsmobile, this well



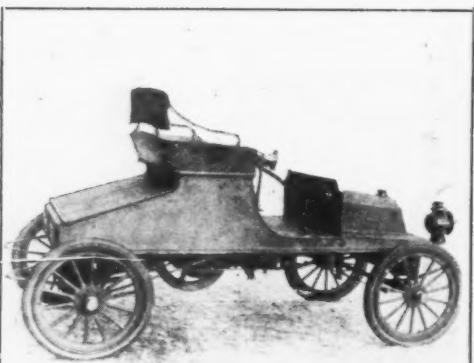
The Knox



The Winton



The Union



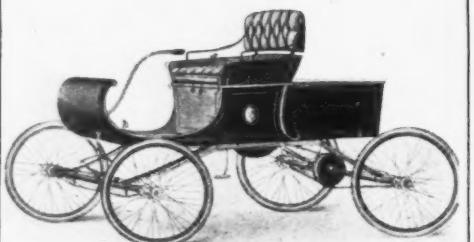
The Konigslow



The Four Cylinder Toledo



The Pierce Motorette



The Oldsmobile



The Duryea Phaeton

known little Detroiter having substantially the same general construction and the same appearance as last year. A new carburetor has been adopted and both the front and rear axles are trussed. The curved dash body remains substantially the same.

RUNABOUT—Two passengers; weight 830 pounds; 4-horsepower motor; one cylinder; 4½-inch bore by 6-inch stroke; jump spark; dry batteries; track 55 inches; wheel diameter 28 inches; wheels wire or tubular; tires 2½-inch; roller hub bearings; two brakes; chain drive to wheels; lever steering; gasoline capacity 4 gallons; radius on one charge 120 miles; price \$650.

THE HAYNES-APPERSON

The Haynes-Apperson Co., Kokomo, Ind.—The 1903 models of this long known car represent the same pattern as formerly—runabout, phaeton and surrey, the company being still of the opinion that its surrey construction by reason of the suspension of both seats well between the axles is more conducive to comfort, especially in long rides, than any tonneau or other European design necessitating the disposition of the rear seat substantially over the rear axle.

RUNABOUT—Two passengers; weight 1,300 pounds; 8-horsepower motor; normal motor speed 700 revolutions; two cylinders; 4½-inch bore by 5-inch stroke; make and break spark; magneto and dry batteries; speed ratio between motor and wheels on fast speed eight to three; wheel base 69 inches; track 56 inches; wheel diameter 32 inches; wheels wood; tires 3-inch Diamond; live rear axle; roller hub bearings; hub and differential brakes; spur gear clutch transmission; maximum speed 30 miles an hour; chain drive to wheels; wheel or lever steering; gasoline tank capacity 6 gallons; water 6 gallons; water circulation by pump and radiating coil; lubrication by pump feed; price \$1,200.

SURREY—Four passengers; weight 2,100 pounds; 12-horsepower motor; normal motor speed 600 revolutions; two cylinders; 5-inch bore by 6-inch stroke; wheel base 84 inches; wheel diameter 36 inches; tires 4-inch Diamond; gasoline tank capacity 11 gallons; water 8 gallons; price \$1,800; otherwise same as runabout.

THE YALE

The Kirk Mfg. Co., Toledo, O.—The Yale is a new one—the product of the factory which has produced Yale bicycles so long. It is not a racer, but a stout touring car of moderate weight and power and with all the conveniences of larger cars. It stands between the big ones and the so-called middle weight cars. Built on a substantial angle steel frame the power plant comprises a double cylinder horizontal motor with a specially designed planetary transmission. Features of the engine are an automatic spark governor and a mechanically operated fuel distributor or mixer.

TOURING CAR—Four passengers; weight 1,700 pounds; 10-horsepower motor; normal motor speed 850 revolutions; two cylinders; 4½-inch bore by 4½-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast speed three to one; wheel base 84 inches; track 54 inches; wheel diameter 30 inches; wheels wood; tires 4-inch Dunlop; live rear axle; plain hub bearings; two band brakes; planetary gear transmission; wheel steering; gasoline tank capacity 8 gallons; water 5 gallons; water circulation by pump and coil; lubrication by mechanical feed; price \$1,750.

THE FLINT

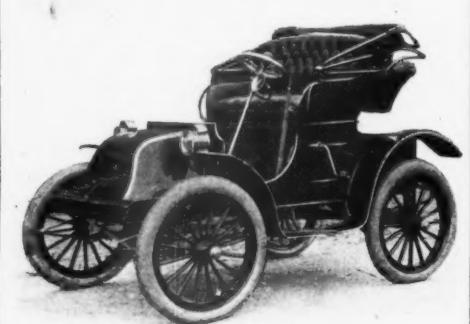
The Flint Automobile Co., Flint, Mich.—The makers of this substantial runabout lay particular stress on the fact that it is a roadster; that its 8-horsepower motor is really that strong and that its rectangular steel frame mounted on three-quarter elliptical springs front and rear furnishes a strong comfortable support for the body, and that its speed gear is controlled by one lever for both forward



The Autocar



The Haynes-Apperson Surrey



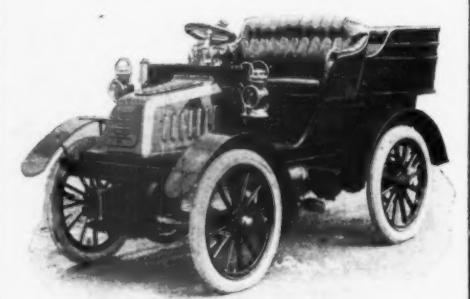
The Haynes-Apperson Phaeton



The Yale



The Flint



The De Dion

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THE MOTOR AGE
Monon Building, Chicago

and reverse drives. A feature of the box dash or bonnet is a large locker for luggage.

RUNABOUT—Two or four passengers; weight 1,000 pounds; 8-horsepower motor; one cylinder; 5½-inch stroke by 6-inch bore; jump spark; dry batteries; wheel base 72 inches; track 56 inches; wheel diameter 28 inches; wheels wood or wire; tires 2½-inch Diamond single tube; live rear axle; ball hub bearings; brake on rear axle and on transmission; planetary gear transmission; speeds on gear 6 to 25 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 9½ gallons; water 6½ gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge 200 miles; price \$850.

THE AUTOCAR

The Autocar Co., Ardmore, Pa.—The Autocar was one of the first moderate size American touring cars to appear with a double cylinder horizontal motor under a hood or bonnet on the front end of the frame, and is still one of the most prominent representatives of this type of construction. The entire construction is simple with the motor appurtenances compactly disposed and readily accessible. The same pattern of chassis is furnished with several styles of body.

TONNEAU—Four passengers; weight 1,550 pounds; 10-horsepower motor; normal motor speed 1,000 revolutions; two cylinders; 3½-inch bore by 4-inch stroke; jump spark; dry batteries; speed ratio between motor and wheels on fast

speed four to one; wheel base 74½ inches; track 54 inches; wheel diameter 30 inches; wheels wood; tires 3-inch G & J; live rear axle; roller hub bearings; three brakes; sliding gear transmission; speeds on gear 6, 18 and 21 miles an hour; bevel gear drive to rear wheels; column steering; gasoline tank capacity 10 gallons; water 4 gallons; water circulation by pump and radiating coil; lubrication by gravity feed; radius on one charge 200 miles; price \$1,700.

THE DE DION-BOUTON

Kenneth A. Skinner, Boston, Mass.—Mr. Skinner has recently returned from Paris where he placed additional orders for De Dion cars of different models. Among these is a two cylinder 15-horsepower pattern, new phaeton styles and the new 6-horsepower pattern with motor in front and entire transmission gear combined with the differential on the rear axle.

TONNEAU—Four passengers; weight 1,400 pounds; 15-horsepower motor; normal motor speed 1,200 revolutions; two cylinders; 4-inch bore by 4½-inch stroke; jump spark; dry battery; speed ratio between motor and wheels on fast speed seven to one; wheel base 86 inches; track 48 inches; wheel diameter 30 inches; wheels wood; tires 3½-inch Michelin; live rear axle; plain hub bearings; two double acting brakes; spur gear transmission with expanding clutch; speed 5 to 30 miles an hour; bevel gear drive to wheels; wheel steering; gasoline tank capacity 5 gallons; water 5 gallons; water circulation by pump and radiating coil; lubrication by mechan-

ical feed; radius on one charge 100 miles; price \$3,000.

THE KÖNIGSLOW

Otto Konigsow, Cleveland, O.—Mr. Konigsow has extensively manufactured automobile parts and fittings before entering the vehicle building field and his new runabout is therefore the result of extended experiment and practice. The water and gasoline tanks, as well as the batteries or coil are on the front of the frame, producing the popular hood or bonnet effect. The engine, transmission, etc., are under the forward portion of the body and easily reached by removing the footboard. There is no mechanism in the rather long rear body, which can be utilized for luggage or for the reception of a tonneau. The planetary gear furnishing the double forward and reverse drives is operated by one lever.

RUNABOUT—Two passengers; weight 1,000 pounds; 6-horsepower motor; normal motor speed 500 revolutions; one cylinder; 5-inch bore by 6-inch stroke; jump spark; dry battery; wheel base 72 inches; track 56 inches; wheel diameter 28 inches; wheels wood; tires 2½-inch Dunlop; live rear axle; ball hub bearings; two band brakes; planetary gear transmission; three speeds, highest 20 miles an hour; chain drive to wheels; lever steering; gasoline tank capacity 6 gallons; water 6 gallons; water circulation by pump and radiating coil; lubrication by gravity; radius on one charge 100 miles.

THE CHARGING AND CARE OF ELECTRIC VEHICLES

It is presumable that every electric carriage user desires to obtain the utmost efficiency from his machine. To do so there are many points in the charging and care which are almost imperative and which may not be commonly considered.

In the first place, it is desirable to have the charging-room well lighted and ventilated and of ample size to permit working on all sides of the vehicle. For convenience in washing the vehicle, a floor made of cement and gradually sloping toward a drain pipe in its center is preferable.

THE RHEOSTAT

The charging rheostat should be divided into several sections, as the vehicle is rarely returned to the charging room with its battery discharged to equal degrees. Consequently where it is desired to have the batteries charged by a certain time, the amount of the charge remaining must be taken into consideration when setting the rheostat lever on any of its points. The rheostat, together with the meters and switches, should be mounted on a slate or marble slab and all within easy reach. The wiring to and from this charging panel should be very carefully executed and in strict conformity to the national code.

One must bear in mind never to move the controller handle while the batteries are at charge, and it is also unwise to handle or touch any of the un-insulated portions of the vehicle while the charging current is on, especially when standing on a damp cement floor. Never run the motor on more than the first notch of the controller when the rear wheels are "jacked up," and only then when in doubt that the vehicle runs easily.

PROPER CHARGING FACILITIES

As the proper charging of the batteries is a feature on which success will greatly depend, it will prove highly desirable that another volt-meter and ampere-meter—in addi-



tion to the one usually furnished on the vehicle—and of the proper ranges be installed in the charging room. Experience has shown that the excessive jar on the delicately adjusted vehicle instrument soon causes it to become out of calibration, and not infrequently entirely inoperative. However, this vehicle instrument is useful, for indicating approximately the current being drawn from the battery and roughly the amount remaining.

Where the voltage of the charging current is fairly constant and steady, an automatic circuit-breaker will prove valuable if it is inconvenient to manually break the charging current at the proper time. Among the more efficient of these automatic devices are those operated by virtue of the increased "back-pressure" from the battery that is being charged. It should be borne in mind, however, that the fact of the breaker being found open, is not always an indication of the battery being fully charged, as this type of breaker is also operated by a decrease in the pressure on the charging mains.

CARE IN WASHING

In washing the various parts, never turn the hose directly on them, for although they may be practically waterproof, the high pressure from the hose may force a small amount of water into a crevice, and do considerable damage. It is much wiser to use a sponge and water.

The motor will, of course, require good lubrication, and an occasional inspection of

the brushes. It should be seen that these are always sufficiently long, for if they become worn down, the spring ceases to press against them and a blackened and roughed up commutator will result. On the other hand, the springs should not bear too hard as the pressure is liable to cause the commutator to become greatly heated, and the solder holding the armature wires will be melted and thrown out. Should the commutator ever become scored or roughened, it should be removed from the motor and carefully trued up by an expert machinist.

PREVENTING BATTERY TROUBLE

The batteries when of a reliable make and comparatively new, or never having been subjected to serious abuse, will probably give as little trouble as any other part of the vehicle, but it must not be taken from this statement that one can neglect them. The directions for their care furnished by the makers should be regarded explicitly. The greatest probable fault to which a battery is liable is an open-circuit either in an individual cell, its connections to an adjacent cell, or the connections with the controller. An open circuit is evidenced by the vehicle running on all but the last one or two notches. It is easily located by placing an incandescent lamp of the proper voltage—or a voltmeter—across the terminals of each tray, or across their connections at the controller. The tray containing the open cell will read very low or more generally not at all.

Buckled batteries may be said to be a thing of the past. Batteries can only become so through an exceedingly high discharging rate, or by allowing the electrolyte to become evaporated far below the plate tops. It will be readily understood that a cell having but one-half of the surface of its plates covered with the electrolyte, will have only that proportion of the capacity of the properly filled cell.

ENTRIES WILL CLOSE SOON

A. C. A. Racing Committee Makes February 1 Dead Line for Aspiring to Be on Gordon Bennet Cup Team

New York, Jan. 6.—There was a full attendance at the meeting of the racing committee of the Automobile Club of America yesterday afternoon. Two important steps were taken in reference to the selection of the American team. In the first place it was decided to close the entries on February 1.

READY BY APRIL

More significant than this, however, was the announcement that candidates for the team must have their machines in New York on April 11 ready for any tests to which the committee may see fit to put them. This seems to insure competitive trials. The reason for this order for early competition of the machines was given out as being in view of the fact that the rules of the race permitted the contest to be held as early as May 15 and a month's practice over the course was desirable for the American team.

CONTEST PLAN CONSIDERED

The committee is understood to have had under consideration the *MOTOR AGE* suggestion for competitive tests combining mile and hundred mile track time trials and a hill climb. Very naturally, though the committee did not care to act hastily in determining so important a matter as the character and methods of the test.

The entry of a second machine by C. W. Matheson, of Grand Rapids, Mich., was also announced.

WINTON MAY PROTEST

It was said that Alexander Winton had announced his intention of appearing before the committee and protesting against the selection of any machine not made by a recognized manufacturer. This gave color to the assumption that Percy Owens' attendance at the meeting was to give utterance to this protest.

It was reported yesterday that two racing machines would be built at the Marion factory for Albert C. Bostwick and a friend. In view of G. F. Chamberlain's statement this morning that no work would be done at Marion and that a factory site was being sought between Stamford and New York it would seem that the Bostwick machines will either be built at the new factory or not at all.

WILL WELCOME MOTORISTS

Geer of St. Louis Says Members of Motor Tour Will be Given Great Time

St. Louis, Mo.—Editor *MOTOR AGE*—I notice in the January 1 issue of *MOTOR AGE*, the proposal of E. H. Corson, of Boston, to organize a mammoth motor cycle tour. The idea received from the writer an enthusiastic reception. He offers his personal time, as well as the time of the store force, to take care of the St. Louis end of this proposed tour. We have a good many local motor cyclists and believe we could organize a reception committee of no mean proportion.

I will place the use of our store room, together with plenty of tools, wash rooms, writing desks, telephones, stenographers, etc., at the disposal of the tourists, without charge, and the writer personally guarantees that the tourists shall have a taste of the famous De Soto course, one of the hilliest and most pic-

turesque tours in America; a trip on the great Mississippi by moonlight, on which the tourists will receive a glimpse of down south scenes, where the "nigger" roustabouts scramble on the lower deck for 5-cent pieces as if they were \$100 bills, and where later on some roustabout will shoot "craps" by the light of the fires from under the huge boilers until he has every "sou" in the crowd; a search on the cycle path; a visit to one of the largest breweries in the country, and in all probability a road race and a hill-climbing contest.

The writer is prepared, heart and soul, to give the tourists the time of their lives, and although I have not yet approached the other dealers, I will stand responsible for the statement that they will keep open house and the motor cyclists can capture St. Louis. All they have to do is to come and get it.

The mammoth world's fair buildings are rounding into shape and present, in their unfinished state, a sight never to be forgotten—a spectacle of acres upon acres of buildings in skeleton forms with thousands of carpenters' hammers beating a merry tattoo on the ribs of the structures, which are designed to form one of the greatest industrial expositions ever held in the history of the world.

This motor cycle touring idea is without doubt a good one and each member that reaches St. Louis will carry to his grave cherished memories of that delightful trip.—HARRY R. GEER.

THE CLAN GATHERS

New York, Jan. 2.—The Automobile Club of America's rooms were well filled all day yesterday with members and guests, the latter predominating. New Year's cheer was dispensed in the Dutch grill room. A punch bowl inspired fraternal greetings and added color to reminiscences.

Dr. S. S. Wheeler is to give a talk at this week's Tuesday club night of the A. C. A. on his automobile tour in Great Britain, France, Germany and the Austrian Tyrol. Lantern slides of camera shots made in all these countries will be shown. This week's club night was devoted to reminiscences. A circle was formed and each member told in turn of the happiest day in his automobiling recollection.

MIDNIGHT MOTOR CYCLING

Motor cyclists for the first time this year competed in the annual New Year midnight race of New York cyclists to Yonkers and Tarrytown. Three motor cyclists started. Henry Almen reached Yonkers first and won the New York Motor Cycle Club's gold medal. He made the 11 miles in 54 minutes. James Farley, remembered as the 14-year-old boy who rode an Indian in the Manhattan Beach 50-mile fuel consumption test last summer, was second in 1:19:00. George Andes was third. All three completed the journey to Tarrytown in the same order, Almen winning the trophy offered by Will R. Pitman.

WILL MEET LAW MAKERS

The Chicago club will meet Thursday evening and will doubtless continue to wrestle with the 8-inch number ordinance which the council wants to make a law. In the meantime a council committee will meet the park board and try to agree on a plan to stop the speed law transgressors. The Chicago club has been invited to send a committee to attend the conference.

FAVOR A CIRCULAR COURSE

Automobile Club of England Believes that Proffered Route for Cup Race Is Best that Is Securable

The Automobile Club of Great Britain and Ireland has on tap a circular course 100 kilometers in length which it is pressing the Automobile Club of France to accept for the running of the Gordon Bennett cup race, even protesting mildly against the permissible 150-kilometer route.

THE BRITISH VIEW

The following letter to Rene de Knyff, chairman of the sporting commission of the Automobile Club of France, by David Solomons, chairman of the foreign relations committee of the Automobile Club of Great Britain and Ireland fully explains the English position:

As regards the Gordon Bennett race, this club would never have thought of suggesting that the race should be run backward and forward over a course of 150 kilometers had your club agreed to vary the rules to suit the convenience of this club, just as this club agreed to vary the rules to suit the convenience of your club in 1900. When your club found itself in a difficulty, and asked the London club to agree to a variation of the rules of the Gordon Bennett cup, the reply of this club was that we would agree to any variation provided you gave us a good sporting chance.

In connection with the race of 1903, this club approached your club to ask whether, to suit the convenience of this club, your club would agree to a variation in the rules by consenting that the race should be run on a circular course of 100 kilometers.

We made this appeal, believing that your club would reply that any course would be acceptable to you which would permit of a good sporting event, and which would suit our convenience. Your club, however, appears to insist upon the letter of the rules, and, therefore, places this club in the awkward position of either having to find a continuous route of from 550 to 650 kilometers, or to provide a route between town and town of not less than 150 kilometers.

The former is, so far as this kingdom is concerned, probably impossible; the latter is possible.

You appeal to me as a sportsman on the ground that the latter is dangerous. I quite agree with you. The committee quite agrees with you. Their opinion is that the best sporting contest, the most interesting sporting contest, can be had over the circular course of 100 kilometers, which was first placed before you, and we venture to appeal to you, in your quality of sportsman, to agree to the proposal first put forward by this club that the race should take place on a circular course of 100 kilometers.

.40 FASTER THAN TRAINS

Automobiles Will Be Run on a French Railway at Over 60 Miles an Hour

That the automobile is likely to reform railway practice is indicated by the current announcement in France that the Gardner-Serpollet company, which builds the famous Serpollet steam automobile, is now erecting railway automobiles which will in June be put into service on the P., L. & M. railway between Paris and Marseilles, and which will cover the 540 miles between the two points in 8 hours, which is 5 hours less than the time now consumed by the regular trains.

The introduction of these railway automobiles is truly a revelation. A car capable of carrying about thirty passengers is hurried over the rails at a speed of over 60 miles an hour, and by a steam engine system not supposed to consume more than 3.4 pints of gasoline per mile for the load, or about 42

gallons per 100 miles for the load—less than $\frac{1}{2}$ gallons per passenger per 100 miles.

PLANS SHOWN IN PARIS

Mr. Serpollet showed blue prints of the car and its constructional detail to a few friends at the Paris show, and so well conceived mechanically did the car seem that it was received with general approval. Representatives of several English railways have, in fact, asked for the first cars to be completed, with view to establishing automobile coach service on their lines. Mr. Serpollet, however, said that he would prefer to establish the first line, as originally intended, over the Paris-Marseilles route and with the present intention of running four distinct lines, one to Marseilles, one to Dijon, one to Lyons and one to Nice.

WILL BE COMPARTMENT COACH

The Serpollet automobile railway coach is $55\frac{1}{2}$ feet long over all, with a wheel base of $42\frac{1}{2}$ feet. Both ends of the car body are pointed. The body is divided into five compartments with seats for six passengers each. There will be a passage the entire length, thus making the coach a cross between a Pullman and a regulation European compartment coach. At the rear end there is a glass enclosed observation platform.

As a result of observations and trials made on French railways, Serpollet determined that to propel the car, which empty weighs 25 tons, at the desired speed, a 180-horsepower engine would be required, and the construction of the vehicle is based on these experiments. It is said that with an engine of this size it will be possible to maintain a speed of about 75 miles an hour up a 1 per cent grade.

LOW CENTER OF GRAVITY

The engine will be of six cylinders and take steam from a 250-horsepower boiler, which will of course be of the Serpollet flash type. The driver sits in a small, enclosed compartment in the extreme front of the car. The boiler, engine, etc., are low down to bring the center of gravity below the wheel axles, with view of securing great stability for fast running.

FRENCHMEN TO BE ON HAND

New York, Jan. 4.—Henri Fournier will exhibit at the New York show. W. H. Webster, of New York, found he would not be able to finish the automobile which is to bear his name in time for the show, and cabled Fournier offering him the space that had been allotted him in the restaurant annex. Fournier sailed yesterday from Havre. Accompanying him were M. Rabourdin, an associate in the Paris Automobile, a garage of which Fournier is the director. The Mors is the leading make handled at this garage, with the Mercedes next in favor, though Panhard and Renault machines are also sold.

M. Charley and his secretary, M. Neubauer; M. Clement, M. Lamberjach, M. Lucas and M. Bertrand, all well known in Paris automobile trade circles, are to sail on the Savoie next Saturday.

M. Charley will visit Pittsburg and Chicago and then cross the Pacific to Australia, where he is interested in the construction of an automobile railroad using Mercedes motors.

AMERICA'S REPRESENTATIVE

Clarence R. Dinsmore, a member of the committee on foreign relations of the Automobile Club of America, has been appointed its representative in the Gordon Bennett international cup committee.

WHAT KIND OF A CONTEST?

This Is What the Manufacturers' Association Wishes to Know—More Severe Trials Are Deemed Desirable

The National Association of Automobile Manufacturers, through Secretary Unwin, has mailed a circular plainly stating the relative systems under which English and French reliability tests have been run and requesting from each member of the association an expression of opinion concerning the character of the next big American test, this request being due to the desire to promote a trial of greater severity and more practical value than those of the past.

THE N. A. A. M. CIRCULAR

The matter is presented as follows:

Several suggestions have been made to our executive committee with regard to future public tests of American automobiles, and after some discussion on the subject at a recent meeting of the committee, it was decided that your opinion be requested.

It has been mentioned that a run from New York to Chicago, via Buffalo, would be a severer test for our cars than any of the trials so far attempted in this country; but, on the other hand, the claim is put forward that a shorter run would adequately develop the various points of merit with much less cost to the manufacturer.

The public is now familiar with the fact that an automobile can run 500 or 1,000 miles without much trouble, and perhaps it would be a wise course to emulate the plans adopted in connection with the French and English demonstrations.

The recent French trials—Circuit de l' Hérault—showed not only the general reliability of their motor cars, but their hill-climbing qualities, gasoline consumption, etc. The competition was over a course of about 100 miles, and the maximum number of marks—30—was distributed as follows:

Gasoline consumption	10
Reliability	8
Hill climbing, including brake test	5
Comfort and appearance	5
Speed	2
Total	30

In the English test, vehicles were classified by selling price, and the entrance fees were graded on the same basis. Motor vehicle parts were entered by inventors, manufacturers or authorized agents, in the effort to prove superiority over similar apparatus.

The system of marking was in some respects similar to the French:

RELIABILITY—For each day's run a maximum of 300 marks, one mark being deducted for every minute the vehicle was at rest from time of starting to the close of the run—excepting compulsory stops for lunch, etc.

HILL CLIMBING—Horsepower multiplied by 100,000, and divided by price in pounds sterling, multiplied by 8 for every shilling's worth of fuel consumed during the day's run.

HORSEPOWER AND WEIGHT—Horsepower, as shown by the performance, multiplied by 100 and by the number of passengers carried, and divided by the weight of the car without passengers.

BRAKES—Maximum 250 points—A car may be disqualified if steering gear or brakes are considered insufficient.

CONDITION OF CAR AT END OF TRIAL—Maximum number of marks, 500. Marks were deducted for parts replaced, and a list of the parts replaced in each car was published in the report.

TIRES—Five marks were deducted for every stop for tire troubles.

INSPECTION—Before the test commenced, every car was inspected by the committee, especially as to arrangement of parts, strength of construction and brakes, and after this inspection was subjected to an actual trial of the brakes on a hill. During the period of the road trials, the cars were closely watched by observers, and all repairs and alterations, and the causes of such repairs or alterations were noted. After the road runs were concluded, the cars were locked up in a garage until they could be again inspected and graded as to condition. It is asserted that both of these operations—preliminary inspection

and rejection of racing cars and other undesirable types, and the final inspection and report on condition—are absolutely essential to a satisfactory and conclusive test.

Quoting from the published remarks of one of the contestants in a recent American trial:

"The idea of the English club to have a run of 1,000 miles with no stops that are not penalized is a better one than ours. Of course, there is luck in the matter of punctures and railroad crossings, but all start with the same chances to take. The matter of allowing for hats blowing off and dropping things is a direct bid for faking. It may be all right to allow a certain few minutes for cleaning and oiling up, but what a simple matter it is for a man to slip in a bolt or two or fix some part while simply oiling up. Yes, it's better to take off a mark for every stop and every minute of attention given to the machine, and let it be seen who can lose the fewest marks."

The object of this circular is to ask your opinion on the subject of future endurance tests:

1—If 100 points be allowed as the maximum for absolute perfection, how many points do you think should be given for each of the features, named in alphabetical order, as follows?

Appearance; comfort; condition of car at end of test; cooling system; gasoline consumption; hill climbing; noiselessness; power and weight; reliability; safety (steering mechanism and brakes); simplicity in handling; speed.

2—What other features, if any, should receive points, and how many points for each such feature?

3—A—Should the contest be over a long course or a short one of, say, 100 miles?

B—If you favor the former, would you support the proposal that there be a run from New York to Chicago about October, 1903?

4—Or do you recommend a test lasting several days, where the machines could run from a central point and back each day in preference to a long-distance run?

FAVORABLE LEGISLATION

New York, Jan. 4.—It is expected that the aldermanic law committee will report favorably this week the new speed ordinance. The ordinance is the result of a compromise arrived at by the automobile club and the committee of fifty. It provides for rates of 8 and 15 miles an hour according to the section of the city traversed. The 15-mile an hour limit will apply to the far uptown boulevards of Manhattan and to the other boroughs on streets where the houses are at least one hundred feet apart.

RAPID GROWTH IN NUMBER

The rapid growth of the motor bicycle industry and sport in England is well shown by the comparative exhibits at the London cycle shows of the past three years. In 1900 there were exhibited jointly 1,585 bicycles and 11 motor bicycles; in 1901, 1,550 bicycles and 161 motor bicycles, while in 1902 there were 1,250 bicycles and 316 motor bicycles.

HARD LINES IN INDIA

Automobilists in India are at present in a dejected condition. They have been officially debarred from the "Coronation Durbar," and the importation of cars is being checked by the enforcement of a boiler act which was never intended to apply to them, and by the restrictions imposed on the import and storage of petrol.

Winthrop E. Scarratt is to be toastmaster at the N. A. A. M. banquet at the Waldorf-Astoria, New York, January 23. Among the speakers will be Hon. John S. Wise, A. R. Shattuck, F. S. Fish and F. Smith.

F. A. La Roche, of the American Darracq Automobile Co.; E. T. Kimball, of the Central Storage Station, and S. B. Bowman, of the Bowman Automobile Co., have returned to New York from the Paris show.

CORRESPONDENCE



INSIDE PEDESTRIAN SPEED

Chicago, Ill.—Editor MOTOR AGE—I am of the opinion that it might be well for the automobile club to take up the question of the imposition imposed upon automobile drivers and owners in Chicago by the ordinance compelling license fees if we must contest the new ordinance compelling each machine to be tagged with a number, small or large. At the same time we might do well also to go further, regarding the speed ordinance of 8 miles an hour, which everybody knows is violated every day in the year by all kinds of vehicles, and is ridiculous as well as unjust. Cleveland has a 15-mile limit outside of a $\frac{1}{4}$ -of-a-mile radius from the center of the city, and other eastern cities are more liberal than Chicago.

In this connection I wish to call attention to the record made by M. H. Donovan at West Port, N. Y., September 15, 1897. He walked one mile in 6 minutes and 22 $\frac{1}{2}$ seconds, this being at the rate of 8.41 miles per hour. There are numerous other cases on record where men have walked a mile at the rate of over 8 miles per hour.—FRANK X. MUDD.

STEERING WHEEL ACTION

Janesville, Wis.—Editor MOTOR AGE—Having successively bent and more or less successfully straightened both steering knuckles of my gasoline runabout, and being rather in a quandary with regard to the accuracy of their present alignment, I wish to ask your advice on a phase of the matter that to me seems interesting as well as difficult. Why is it that although the wheels when in a position in which they would direct the vehicle in a straight path are parallel they lose their parallelism on being turned, so that on being deflected the maximum amount they lack considerably of being parallel, the wheel that would be on the inside of the circle of the vehicle's course if it were running having the greater deflection, whether it be one or the other? Is this condition avoidable, or does it do no harm?—E. TRACY BROWN.

The position assumed by the wheels when given their maximum throw is correct. If a straight line be drawn as a continuation of the rear axle and straight lines projected from the hubs of the steering wheels at right angles to the wheels these two straight lines should intersect each other at a point on the straight line which forms the continuation of the rear axle. Consequently the inner wheel on a curve will have a greater throw than the outer one. The inclining of the steering knuckle levers toward each other is done to produce this effect.

KEROSENE BURNERS

Chattanooga, Tenn.—Editor MOTOR AGE—Will you kindly give me some information concerning kerosene burners? I am at present using gasoline, but I find I will soon have to buy a new burner, and if kerosene is the best I want it.—W. R. LONG.

There have been many experiments along the line of kerosene burners for steam carriages but at the present none has resulted in the continued marketing of such a burner. It is an attractive problem but one which has not yet led to notable commercial results.

CORRECTIONS CORRECTED

Minneapolis, Minn.—Editor MOTOR AGE—In view of the fact that the two cycle ball-bearing bicycle motor recently shown in MOTOR AGE has created no little amount of interest in motor bicycle circles, and as I suppose more than one will have patterns made following your illustrations and descriptions, I beg to call attention to what I consider an error and what might cost someone time and money and labor if not discovered until after the patterns are made and parts machined. It appears to me in looking at yours illustration to be impossible to put the crank shaft into place if the crank case is made as illustrated. In my opinion the crank case should be constructed with the customary crank case covers, and even then it would be a difficult matter to put the crank shaft into place without having the lower end of the connecting rod constructed with the customary split box or bearing. The ball-bearing feature is out of question for anyone not accustomed to or not fitted up for grinding ball races, as no man can harden and temper them without warping them. If not ground they will cause a leaky crank case, resulting in a poorly working motor, as a two cycle motor depends upon an air-tight crank case for success. The illustration shows the exhaust port in the wrong position, as the lower edge of both exhaust and inlet ports should be on an even line with top of the piston when it has reached its downmost position—the exhaust port being larger, of course, so as to open ahead of the inlet port. In good practice the deflector should run parallel with the cylinder wall and much closer than shown.—OSCAR M. BERGSTROM.

The illustration of the two cycle bicycle motor shown in MOTOR AGE of December 11 is correct in design and detail as it is shown. The exterior view of the motor herewith shows the

construction of the crank chamber, which is parted on the center line of the crank shaft. To put the crank shaft and connecting rod into place is a simple and easy matter, and requires no covers or end plates on the crank chamber, as stated. The crank shaft with its bearings and connecting rod in place is laid in the upper half of the crank chamber, while in an inverted position; the lower half is then bolted in place, the crank chamber placed right side up, the piston attached to the connecting rod in the usual manner and the cylinder put on over the piston and secured in position.

It is not necessary with this style of construction to have a loose cap on the connecting rod, or covers on the crank chamber. This type of construction is in use on automobile motors of both American and European manufacturers.

Ball-bearing cups and cones are not of difficult manufacture, even in a small way. Hundreds of cycle repairers are prepared to make either hardened tool steel or case-hardened mild steel cups and cones.

If the area of the exhaust port is of the proper size, it is not necessary to bring the port down to the top of the piston. It is better to have the baffle plate at a slight angle as shown than vertical, as it reduces the back pressure on the incoming charge, which consequently gives it greater velocity and assists in more thoroughly expelling the exhaust gases.

PATENT REFORM NEEDED

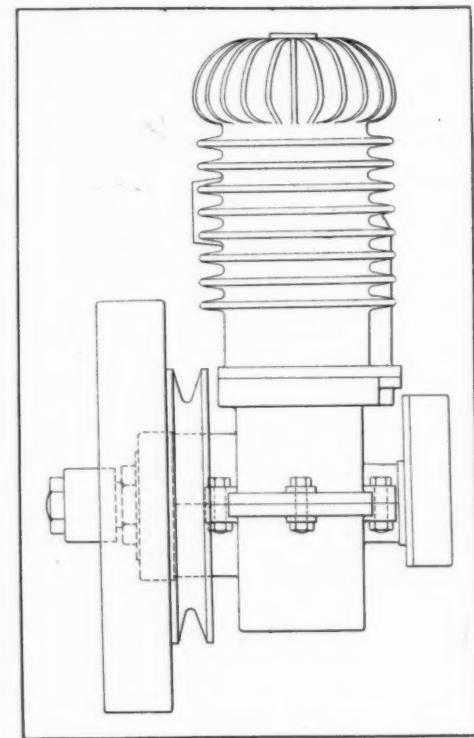
Reading, Pa.—Editor MOTOR AGE—Your comments regarding insufficient classification in the patent office are to the point. Unfortunately the fault is not so close at hand as the patent office, for the people of the United States are themselves to blame. For years the commissioner of patents has called attention to the rapidly growing business of the patent office; to a 5 or 6 million-dollar surplus derived therefrom lying idle in the United States treasury, and to the value of increased room and facilities to inventors and the public at large. This message has been unheeded by the representatives of the people and on this account the evils which you so rightly point out still exist.

The whole matter is a disgrace and it seems incredible that intelligent legislators should refuse to permit the proper expenditure of money which the inventors of this country have paid to the government for services that are not rendered. The patent office is the only government office that is run at a profit and there would seem to be no reason why inventors should be taxed to pile up money in the treasury. Either the patent fees should be reduced to the absolute cost of running the patent office, or the service and protection should be increased to the full extent of the patent fees. I trust you will give this matter your attention and agitate further along this line. It certainly needs it.—CHAS. E. DURYEA.

ANTI-FREEZING SOLUTION

Green Bay, Wis.—Editor MOTOR AGE—What is a good solution to keep water from freezing in an automobile; one that will not corrode the pipes?—FRED C. CLABOTS.

A 20 per cent solution of glycerine will under ordinary variations of temperature answer the purpose. For extremely cold weather a solution of 2 pounds of chloride of calcium can be used to better advantage.



MOTOR AGE

The Two Cycle Motor

AN UNIQUE FRICTION DRIVE

System of Roller and Disk Variable Transmission in Which the Usual Method of Construction Is Reversed

The elusive yet ever attractive friction drive problem has recently been given a new solution by the Marble-Swift Automobile Co., 1464 Monadnock block, Chicago. The experimental automobile which has been equipped with the transmission operates promisingly and its makers are confident that they have finally put this elastic of all elastic variable speed gears into

As friction drive has been used heretofore, it has been customary to cover the disk or disks with leather or some metal softer than the driven roller. This and its disadvantages are obviated. The disks are made of cast iron, while the rollers are made with a paper friction surface. This method prevents wearing on flat surface, is economical in manufacture and conducive to long life of the parts. It is obvious that the rollers will remain round, insuring positive contact.

EVIDENT ADVANTAGES

The gear is susceptible of quick and positive manipulation, and any speed may be obtained from one mile an hour to as high a speed as



MOTOR AGE

a shape which will be more popularly acceptable than many previous ventures into the friction field.

In the Marble-Swift transmission the almost universal custom of driving from the disk is reversed, the drive being from two friction rollers. These rollers are fitted to an extension shaft of the longitudinal motor which is provided with a key-way upon which the rollers are loosely splined. The friction rollers are controlled by a speed changing lever that causes both to move a uniform distance from the center of disks upon a cross two-port counter shaft, so that both disks will be driven at the same speed. The roller shaft is connected to the motor by a flexible and intermediate shaft with knuckle joints, and is supported at each end by a sliding journal, allowing the rollers a lateral movement that they may engage the opposite sides of the opposed disks.

Forward speed is obtained by a slight movement of the starting lever, which throws the front end of the roller shaft so as to engage the forward friction roller with one disk and the roller with the other. For reverse drive movement of the same lever in the opposite direction causes the friction rollers to engage the opposite disks respectively. Any speed may be obtained by the speed changing lever, which moves the rollers uniformly to and from the center of the disks. On account of the rollers driving the disks the slow speed is obtained on the outer edge of the disks and the faster speeds toward the center.

READY WITH A TOURING CAR

The White Company Will Introduce a Big Long Distance Tonneau Machine at the New York Show

White Sewing Machine Co., of Cleveland, has completed a touring car model which it is now prepared to market. Last year the company built a large, double seated machine for experimental purposes and after testing it thoroughly, made a number of changes in style and construction, resulting in the building of the car illustrated. The lines of the typical American gasoline car have been followed in a general way, the front end bonnet and the tonneau seats being prominent in characterizing its exterior.

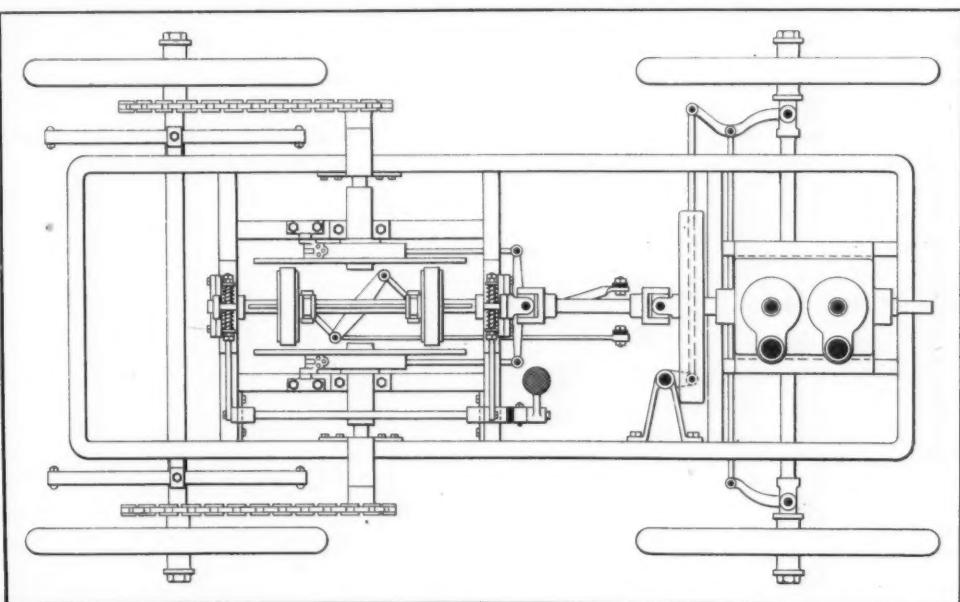
SUBSTANTIAL CONSTRUCTION

The White company expects the new car to be one of the sensations of the New York show, where it will make its formal debut. It is equipped with a vertical compound engine placed in front, under the hood, and rated at 10 horsepower. From the low pressure cylinders the exhaust steam passes into the condenser on the extreme front end of the frame. The gasoline and water tanks, holding 10 and 15 gallons, respectively, are placed in the rear. It is claimed that through the aid of the condensing outfit, the fuel supply will last for 100 miles over average roads.

The wheel base of the car is 6 feet 8 inches, and the tread 4 feet 8 inches. Thirty-inch wheels of the artillery type, fitted with 4-inch Goodrich tires are used. The extreme length is 10 feet and the extreme width 5 feet.

The White company does not say much relative to the speed of the car, but it is understood that a machine of this general type will be used if the White is selected as a member of the American team for the Gordon Bennett trophy contest. Rollin White has already forwarded the entry to the Automobile Club of America and expects, on account of the fact that the White is among the few high speed steam cars made in this country, that it will be accepted.

Except for the difference in body, power and the heavier construction of all parts, the equipment of the new car is substantially the same as that of the regular steam carriage which the company has manufactured extensively during the past two years.



MOTOR AGE

THE MARBLE-SWIFT FRICTION TRANSMISSION

STEEL FRAMES AT PARIS SHOW

Numerous Prominent Makers Display Vehicles With the New Pressed Sheet Steel Main Structure—Its Principal Characteristics and Advantages—Strong, Plain, Light and Durable

As briefly mentioned by MOTOR AGE in last week's review of the show, the single change, improvement or radical departure from preceding practice most notable at the Paris automobile exhibition was the stamped or sheet steel running gear frame. The exhibits at the salon indicate that the French trade is arriving at a common ground in the matter of chassis design and that it is not at all improbable that the finality of this structure will be the simplest possible form of rectangular stamped or pressed steel frame.

In the construction of running gear frames the French makers, like those also of England, America and Germany, have wandered into all known structural routes; have adapted to automobile construction all of the styles of frame structure which have been successfully used in other branches of machine building.

Most prominent among the early frames was, of course, the tubular frame, its wide use probably being due to the influence which the practices of the bicycle trade exerted upon the automobile industry. This form of structure has been maintained in numerous instances and even at the show of this year it is well represented by different prominent makes of automobiles. Alongside it, and about equal to it in prominence, are the channel iron and wood frames.

All the examples of these three forms of construction accentuate the tendency to simplify the chassis and to rid it of the under or sub frame which was earlier used to support the motor and transmission gear case. Where the under frame is used it is more essentially a part of the main frame and more nearly in the same plane with it. In all of the frames there is remarkable a desire to support them as low down onto the axles as possible.

TENDENCY IN FRAME DESIGN

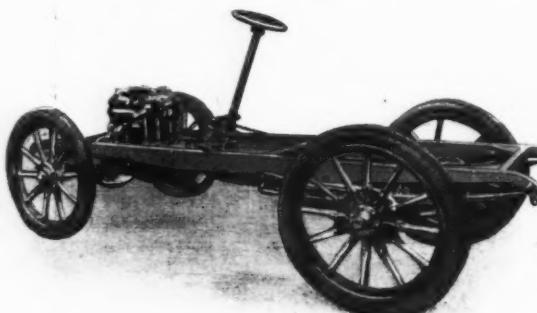
The general and widely acknowledged tendency in the structure of the chassis having been to reduce it as closely as possible to simple rectangular frame it is not surprising that the introduction of the stamped steel frame—fulfilling this desire, more nearly than any other in addition to possessing other and inherent advantages—has resulted in the quick appreciation of its usefulness and the adoption of it by several of the most prominent French makers exhibiting at the salon. Thus at the show the pressed steel frame was shown on models of such international fame as the Panhard & Levassor, Mors, Clement, Darracq, Deauville, Georges & Richard, Peugeot, Desmarais & Morane and Delahaye.

PRESSED FRAME COMMERCIALLY PRACTICAL

The introduction of this frame is due to the Arbel brothers, who operate large forging and sheet steel stamping plants that have been devoted principally to locomotive and marine work, such as the pressing and stamping of the sheet metal work on locomotives and the forging of steamship crank shafts and propeller blades. It is hardly necessary to say in this connection, then, that it makes its debut in practical form and from a process of manufacture in

which rapidity and cheapness of construction have been considered as well as actual mechanical usefulness.

The Arbel frame, as it is commonly called, is made to the specifications of the different automobile manufacturers, but in all patterns is simple and of the same general character, the intention having been obviously not to create a new type of frame but to construct the type generally conceived as the most suitable in a way which would rid it of the chief faults of the several other prevailing systems of construction. It represents a construction whose principle and advantages are easily conceivable and which might have been introduced long ago by individual automobile builders but for the fact that it was considered to be a rather complicated, heavy, expensive and withal difficult undertaking in the sheet steel pressing line.



MOTOR AGE

The Darracq Chassis

As presented by the patterns exhibited at the salon, the sheet metal frame is generally of channel section with the cross section of the side bars reducing gradually toward the end, and often terminating in downwardly curved projections serving to support the springs after the manner of the conventional and well known "pump handle." The end cross bars and the transverse members for the support of the motor and transmission gear are also generally of channel section, and these members and the side members are so joined by interlocking fits that the rivets which secure the joints are subjected only to straight tensile strains and not to the shearing cross strains which have often in the past proven so detrimental to the lasting strength and security of frames of angle iron and of wood lined with flitch plates.

In some instances the frames begin to taper

laterally a little ahead of the middle, the intention being to make the front end as narrow as possible in order to allow greater turns of the steering wheels. This feature, however, is a point in design evident throughout the show and not a particular characteristic of the pressed steel frame.

THE CONSTRUCTION IS LIGHT

The pressed frame being rid of many of the objections encountered in the construction of other types of frames and that can only be overcome by the use of otherwise unnecessary weight, it is natural that it should be extraordinarily light in proportion to its strength. There are no unions depending entirely upon the security afforded by the rivets or bolts; there is no brazing to weaken the metal and to loosen under the continued effect of the great amount of vibration to which an automobile frame is subjected. There are no motor frames entirely independent of the main frame and liable to become loosened or thrown out of alignment.

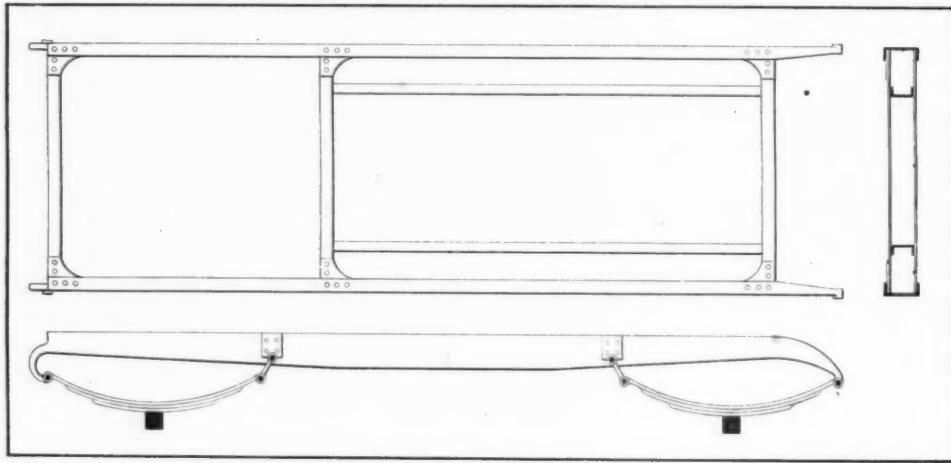
The Arbel frame, as nearly as is mechanically possible for a structure of the necessary shape, is a single piece and it more nearly than the angle steel and steel lined wood frames effects the ideal of homogeneous structure of the whole. The average weight of these frames for cars of moderate power is 77 pounds. In testing one of the frames built for the Darracq company a weight of 16,400 pounds was successfully sustained, not only without breakage but without throwing the frame perceptibly out of correct shape.

NOT EXTREMELY RIGID

The strength of the frame is of a peculiar character. It does not embrace the greatest rigidity, the frame being somewhat elastic and capable of returning to its correct alignment after a severe shock. In this respect it possesses the quality of resilience which has probably led many manufacturers to choose the wood frame construction with view to preventing the deterioration and subsequent breakage likely to occur in the case of an extremely rigid frame constantly subjected to the vibrations of the motor and the jar transmitted from the ground.

Summarizing the character of the Arbel frame, it is not out of the range of reason to suggest that it leads the way to a successfully pressed one-piece steel frame.

The Standard Motor Vehicle Co., of Chicago, is progressing so well with its plans that it expects to have a vehicle ready for the Chicago show, at which it has secured space.



MOTOR AGE

THE DELAHAYE PRESSED FRAME

NECESSITY OF GOOD MOTOR CYLINDERS



That there are makers of motors who fall just short of making their product quite all that it might be, who turn out fairly good motors, but do not get the power that their dimensions would indicate, cannot fail to impress those who know what ought to be but fail to find it in some motors they examine with view to buying. The trouble may be due to one of many sources, but there is one source of unsatisfactory efficiency which is seldom given the attention deserved—the character of the cylinder.

CAREFULLY SELECTED IRON

The class of iron from which the cylinder is cast has much to do with the subsequent performance and durability of the motor. Porosity, blow holes or other defects in castings are to be most religiously avoided, and iron which is soft, coarse-grained or unequal in its composition is unsatisfactory. Opinions differ as to the best mixture of iron for the cylinders of internal combustion motors, but the requisite characteristics are generally considered to be hardness, toughness, equality of strata and closeness of grain. Furthermore it should exhibit in fracture an appearance of moderately high carbon steel, of a duller gray color, but equally free from black specks and sponginess. One foreign maker uses four parts of the best Scotch iron to one part of selected scrap. But if iron founders are sought for advice it will be found that their opinions differ greatly and are sometimes prejudiced.

While the nature and composition of the cylinder metal is of first importance in all classes of motors, the use of small air-cooled cylinders brings about most exacting demands, both regarding the mixture and character of the metal used and the skill and care employed in the actual process of casting. Of course, the character of the patterns is important, and, although somewhat trite, it is worth note that hardly too much expense can be put into them. Like the foundations of an expensive structure they cannot be skimped.

DISTRIBUTION OF METAL

In either water-cooled or air-cooled cylinders the distribution of metal is a nice point for the designer and pattern maker. In air-cooled cylinders this matter demands knowledge and discrimination such as can only be gained by experience. A slight overthickness may result in walls causing undue overheating that no arrangement of radiating fins can counteract. On the other hand, an opposite extreme can be reached, where the cylinder wall is too weak to withstand the shock of combustion.

While the margins in the design of water-cooled motors may not seem to be so fine, it is because of lack of appreciation of this point—that many well designed and fairly satisfactory motors may not be as efficient as they might be. It should be remembered that radiation is more than a name, whether it be accomplished by water or air. If an accurate determination of cylinder wall thickness is good for the best effects with air-cooled cylinders it will certainly pay, for the same reasons, to

study wall thickness in water-cooled motors. Many view the matter from the standpoint that air-cooled motors should be made light as possible, while weight is not so important in water-cooled motors. Of course, these conditions are true in themselves, but they should not be considered. The cylinder wall should be proportioned for the best radiation effects and the water space and jacket wall considered from the same initial standpoint.

OVER DOING RADIATION

A prominent foreign motor maker has carried on experiments in the distribution of metal in thin cylinder walls to secure practical data on the radiation problem. Just as in the early days of the gas engine, students tried to get rid of compression after the intake only to discover that the compression was a valuable factor; so did many motor makers for a time overdo the extent of radiation. The gasoline motor is purely a heat motor and chilling the charge at once after ignition is an obvious disadvantage. Because of this the thickness of the cylinder walls, the dimensions and volume of the water space and the thickness of the water jacket are yet problems that leave room for study in attempting to increase the efficiency of the motor.

In air-cooled motors there are troublesome points to settle in the designing and proportioning of the radiating fins or webs as regards their number, thickness and depth in relation to the cylinder area and the degree of compression used. In fact, there can be found an increasing number of those who believe that when these points are better understood, from practice in considerable use, there can be motors for reasonably powered vehicles built without resorting to water cooling and its attendant expense and troubles.

WEARING TENDENCIES

When it comes to changing the cylinder from its raw to its finished state it is first of all important that the bore should be a true circle and devoid of taper. Then the wall should present a smooth and highly polished surface for the piston travel. The smoothness or polish in the gasoline motor is of far greater consequence than in the case of the steam engine, more especially in the smaller sizes, because of the higher temperature and consequently increased difficulties in lubrication and by reason of the increased retarding effect of the friction of the trunk piston.

Other than such accidents as pieces from the ring flanges of the piston, and fragments from the rings becoming jamped and scoring the cylinder walls, the chief influence in wearing the cylinder out of its true circle is the diagonal thrust of the piston rod during the power strokes. In time the tendency is to wear the cylinder oval along an irregular line; also into a V shape with the wide angle at the inner end or point where the power stroke commences. The cylinders of all internal combustion engines wear untrue more quickly than do steam cylinders because of the absence of the piston rod gland, which prevents diagonal thrust, and

on account of the higher average piston speed and less perfect lubrication. To overcome the diagonal thrust some designers set the flywheel crank center toward the return side of the connecting rod, so that the power thrust will be in an approximately straight line.

LAPPING AND GRINDING

Most all motor makers—it is a pity that all cannot be written without exception—believe in giving the inner wall of the cylinder a perfectly smooth, if not a polished, finish. But they are not agreed as to the best methods to employ. Some continue the practice of "running up" the cylinder—that is, assembling the motor and driving it from a power shaft with plenty of oil until the walls are worn smooth. After this a new set of rings are put in. Others lap with a mass of lead somewhat longer than the cylinder and cast on a rectangular bar. This lead lap is turned an easy fit to the cylinder bore and successive grades of emery and plenty of lubricating oil are then used on it while it runs at a high speed within the cylinder.

The objection urged against the first method is the cost in time, while that against the second is that the emery becomes imbedded in the walls of the cylinder to some extent and keeps on cutting forever afterward. It is urged that dry grinding with an emery wheel has now been so perfected that it is the best method of the three. It is quicker, leaves no imbedded particles to grind afterward, is absolutely accurate and extremely sensitive in adjustment.

THE LADY AND THE MOTOR CYCLE

The guidance and control of an automobile by a woman is no longer an uncommon sight, but it is not an ordinary sight to see a woman handling a motor bicycle on the roads. Yet there are a few of the gentler sex who are experts in handling the two wheeled machines. One of the most prominent of these women riders is Mrs. F. P. Kent, of Waltham, Mass. She has a little Thomas Auto-bi, and the way she goes along the streets with it is surprising.



MOTOR AGE

Mrs. Kent—Motor Cyclist

AGENCIES SECURED RAPIDLY

Oldsmobile Dealers Are Established in All Large Ohio Cities—How One Agent Drew Trade—A New Electric

Cleveland, O., Jan. 5.—R. R. Owen, manager of the Oldsmobile Co., is planning for an exceedingly strenuous campaign in this state during the coming season. He has had things almost his own way on light vehicles during the past two seasons, but for 1903 he is likely to have great competition, in view of the many vehicles being built in Cleveland and Toledo and which will be sold through local stores.

Mr. Owen has the whole of Ohio for the Olds, and has been doing much traveling during the past few weeks, with the result that he has closed with agents in Columbus, Springfield, Toledo, Dayton, Cincinnati, Akron, Ashtabula, Conneaut, Painesville, Findlay, Lima, Canton, East Liverpool, Wheeling, Charleston and New Philadelphia. As an agent is obliged to contract for several vehicles, it will be seen that the Olds is likely to cut an important figure in the Ohio field another season.

A HUMANITARIAN ACT

Aside from his work of placing agencies, Mr. Owen is doing some unique advertising on his own account in Cleveland. Mention has already been made in MOTOR AGE of the way he equipped several vehicles with delivery boxes and furnished them gratis to the local postoffice authorities Christmas week. This scheme brought the Olds a large amount of free local newspaper advertising. Another plan which worked equally well, so far as newspaper mention is concerned, was the fitting of a snow plow to the back of an Olds and cleaning the snow from in front of the homes of some of Cleveland's best citizens before they were up. It was not intended to demonstrate that an automobile could be used advantageously as a snow plow, but it certainly showed the strength of the little machine and its adaptability for traveling in deep snow under a heavy load.

MAGNET FOR CUSTOMERS

D. Vanderpool, of Springfield, O., agent for the Olds, was in the city last week arranging for hurry-up shipments of sample machines. Mr. Vanderpool handles all kinds of automobiles and bicycles and about every variety of sporting goods imaginable. Last year he proved one of the best subagents for the Olds in the state, and aside from his regular sales, he adopted several unique schemes for disposing of automobiles which enabled him to sell a number of machines at advantageous figures. During the sporting goods season he gave an automobile raffle ticket with each dollar's worth of goods. Of course, the goods were marked up slightly so that he came out ahead on the automobiles. During the summer months he took several short automobile tours throughout the counties in the central portion of the state and sold tickets on automobiles at the rate of 10 cents each, or three for 25 cents.

Mr. Vanderpool has a wide acquaintance in the district mentioned and the plan worked admirably, thousands of tickets being sold. Of course, the scheme was conducted in a legitimate manner and the winners in every case were awarded their automobiles without partiality. Mr. Vanderpool reports that motor cycles are attracting much attention in

Springfield and vicinity. Last year he sold seven, and all them have proven satisfactory, with the result that he expects to dispose of several times that number during 1903.

WITH WILLARD BATTERIES

The Homer Commutator Co., a well known electrical concern, is planning to build light electric vehicles. The company has completed an experimental machine which is now being tested. It is equipped with a 1½-horsepower motor and a battery manufactured by the Willard Storage Battery Co., which has given it a radius of 35 miles with a single charge, considered very creditable for snow covered roads. The vehicle weighs about 1,200 pounds, and presents a neat appearance.

MORE SHOW EXHIBITORS

The following concerns have been added to the list of exhibitors at the coming New York show since the last announcement: Fisk Rubber Co., Chicopee Falls, Mass.; Brown-Lipe Gear Co., Syracuse, N. Y.; the Midgley Mfg. Co., Columbus, O.; Timken Roller Bearing Co., Canton, O.; Fickling & Fulton, New York; Stearns Steam Carriage Co., Syracuse, N. Y.; Union Motor Truck Co., Philadelphia, Pa.; American Coil Co., Somerville, Mass.; Standard Automobile Co., New York; the Motor and Gear Mfg. Co., New York; Hyatt Roller Bearing Co., Harrison, N. J.; Whitlock Coil Pipe Co., New York; Shelby Steel Tube Co., Pittsburgh, Pa.; Mfg. and Selling Co. of America, New York; Electric Contract Co., New York; Desberon Motor Car Co., New York; Goodson Electric Ignition Co., New York; Edison Storage Battery Co., Orange, N. J.; New Jersey Asbestos Co., New York.

NEW INDIANA COMPANY

With a man well known to the automobile industry at its head the Premier Motor Mfg. Co. has been organized at Indianapolis. Its capital is \$50,000, fully paid, and although the name of the concern was not selected until last week, the printed matter is out, the factory is running and a car will be exhibited at the Chicago show. The man who has accomplished so much is H. O. Smith, president and manager, who, a few weeks ago, retired from the presidency of the G and J Tire Co., a position he had held ever since that company was organized. The stock of the new corporation was sold at 100 cents to a dollar and a factory has been established at 222 to 228 West Maryland street. The mechanical head of the company is George A. Wiebely, who is also its treasurer. The company car will, of course, be known as the Premier.

CHANCE FOR MANY SALES

Ottawa, Ont.—Editor MOTOR AGE—There are only three automobiles in this city and they are owned by parties who went to the United States and personally bought them. There is not an agency of any kind here, and if one were established I feel sure there could be quite a number of machines sold. I personally know five or six parties who want to purchase, but do not like the idea of buying from a catalogue, without seeing how the car runs. Our city is a wealthy one, being the capital of Canada; and our roads are good. I am contemplating taking an agency for some good automobile in connection with my bicycle business. Of course, the 25 per cent duty brings prices up, but the manufacturers should be willing to make concessions to offset this.

—H. BROUSE.

BIG EASTERN PLANT SOLD

The Pan American Co. Buys the Complete Marion Factory of the Defunct Automobile Co. of America

New York, Jan. 6.—George F. Chamberlin, counsel of the Pan-American Motor Co., gave out this morning the correct story of Mr. Bostwick's company's acquirement of the plant and machinery at Marion, N. J., formerly owned by the Automobile Co. of America.

It is an out and out purchase. The capital of the Pan-American has been raised to \$500,000 and the number of directors has been increased to nine. James Woodbridge, formerly of Pratt & Whitney, of Hartford, Conn., has been made vice-president and general manager, and W. M. Powers, designing and consulting engineer.

A factory site is being sought on the line of the N. Y. & N. H. R. R. between Stamford and this city, to which all the machinery of the Marion factory will be moved. Mr. Powers has just returned from Europe and brought several ideas of construction that have met the approval of the directors.

METROPOLITAN HEADQUARTERS

The entire building at 134 West Thirty-ninth street, opposite the Metropolitan opera house, New York, has been leased by the Electric Vehicle Co. for its New York up-town headquarters. The store has a frontage of 75 feet with a depth of 100 feet. The entire front is of glass with bronze framing. It is the intention of the company to make this one of the largest and most handsome automobile repositories in the metropolis. The store contains ample space for the display of over 100 vehicles. The work of refitting the premises for the new occupants is already under way, and it is hoped that the opening will take place about the middle of January, during the automobile show at Madison Square Garden.

SUPPORT BUT TWO SHOWS

The members of the manufacturers' association have once more expressed a desire that the number of shows at which makers themselves exhibit shall be limited to those at New York and Chicago. They agree that local exhibitions, supported by local dealers, are desirable, but say the latter receive a fair discount on the goods they handle and therefore should not call on the makers to pay expenses incidental to the sales. Such seems to be the opinion generally held, as indicated by replies to a circular letter of inquiry recently sent out by the association.

KALAMAZOO ENTERS THE FIELD

The Michigan Automobile Co., Ltd., is the name of a \$150,000 stock company recently organized at Kalamazoo, Mich., for the purpose of manufacturing automobiles. The directors elected at a meeting at the office of the Kalamazoo Cycle Co., December 30, are Dallas Boudeman, W. E. Upjohn, Frank D. Fuller, Charles D. Fuller and M. E. Blood. The active officers are Frank D. Fuller, secretary and business manager; M. E. Blood, treasurer and general superintendent, and C. D. Fuller, chairman of the board.

The automobile to be manufactured is called the Blood, having been designed by M. E. and

C. C. Blood, of the Kalamazoo Cycle Co. These machines will be among the lightest practical automobiles that have ever been put on the market, the weight being about 400 pounds. A year's experience in running several of the cars is said to have proven them to be durable and reliable. The Montgomery Ward buildings, with 4 acres of ground, have already been purchased and the new company will begin to manufacture at once, expecting to be able to turn out from one to five machines a day by April.

WANT TO BUY A TRUNK?

Judgment was rendered last Friday, in a Racine (Wis.) court, against E. J. Pennington, for \$200, due for board at the Hotel Racine, from which the far-famed promotor of air-ship and automobile enterprises disappeared recently. Four or five trunks were attached and the contents will be advertised for sale. Pennington is charged among other things with making a trip to Cincinnati in a special car with a dozen attendants, engaging the best suite of rooms at the Nicholas House, running up of a \$900 board bill at that hotel, issuing worthless checks for the same, and then suddenly departing, this being followed by the issuance of a warrant for his arrest.

ON A LARGER SCALE

The H. J. Koehler Sporting Goods Co., of Newark, N. J., has enlarged its automobile department to about double the space utilized last year. The company has renewed contracts to represent the Rambler and Waverley in northern New Jersey. One-half of the two lower floors of the extensive building occupied will be devoted to automobiles and in conjunction with the sporting goods a full line of automobile sundries and clothing will be handled.

RUBBER STRIKE VULCANIZED

A strike of the Morgan & Wright rubber workers, which had lasted over 6 weeks, came to an end at midnight of Friday last. An agreement was made restoring the same conditions as prevailed before the strike. There was no complaint, the men said, about the hours or wages, but bad faith was charged against the management. About 1,100 men and women were thrown out of employment and at one time the company threatened to close the plant permanently.

ANOTHER LARGE GARAGE

The Rainier Co., of New York, is to erect a four-story garage on the corner of Fiftieth street and Broadway. The motor vehicles of the Berg company and the commercial automobiles of the Vehicle Equipment Co., will have their headquarters at this station.

CARS WANTED FOR INDIA

The Provincial Cycle Exchange Co., 167 Chapel street, Meerut, India, desires to receive catalogues of motor cars, motor cycles and bicycles with a view to representing them. All details of terms should be forwarded at the same time. The company represents five high-class English houses.

The purchaser of goods under an express warranty is not precluded from a recovery for a breach of the warranty by his failure to offer to return the goods.

A LESSON IN ADVERTISING

Experience of Leaders in Bicycle Trade Material for Thought on Part of Automobile Makers

The New York Advisor recently printed, and the daily press has freely copied, an article on the injurious effects of curtailing advertising which may interest the automobile trade, and especially those members of it who erroneously complain that the industry is burdened by too much publicity. Several years ago, the Advisor said, the large bicycle companies of the United States formed a combination—or trust—and all of the leading cycle companies were brought under a single management.

ADVERTISING DECLINE

One of the first apparent results was the cessation of the large individual advertising campaigns which marked the progress of the individual companies. The trust used very little advertising and merely endeavored to popularize the names of its leading machines.

Some time ago this great concern, the American Bicycle Co., went into the hands of a receiver.

Col. A. A. Pope, who was the pioneer advertiser in the cycle field and whose Columbia wheels were for years the standard of perfection in bicycle production, was asked about the outlook for the company in the future.

SALES FALL OFF

After saying that the Columbia factory at Hartford would soon resume operations he added:

"The cessation of advertising killed the bicycle business, and the way to revive it is to resume that same important matter. You can see how I feel in the matter when I tell you that I spent \$500,000 in one year in that sort of publicity, and that it is my idea for the future—to advertise."

When the trust was organized the wise-aces said:

"We are spending our earnings for advertising—if we combine all the leading companies we need only do as much advertising for all as one company is now doing."

COMPARATIVE RESULTS

This policy was followed and the result has been a decline in what has been called the bicycle fad—and the trust is in the hands of a receiver and the industry paralyzed.

The cracker trust, the tobacco trust and others have been notable successes—the bicycle trust a notable failure.

The first have been liberal—nay, prodigal, advertisers. They have been constantly placing new names before the public and almost without exception achieving individual successes. The bicycle people endeavored to advertise half a dozen or more wheels in a general way—there was nothing specific in the announcements—with failure as the final result.

E. V. CO. SECURES GOOD PATENT

Another interesting patent has just been issued to the Electric Vehicle Co., of Hartford, Conn. It covers patents of H. P. Maxim's gasoline car construction. Granted December 30, 1902, it was filed several years ago, before the Columbia Mark VIII gasoline car was actually on the market. That car, which was the first American vehicle to have a vertical front disposed engine, had its motor differently supported from the present gen-

eral practice, but several features common to both appear to be covered in the present patent. The bodily removable bonnet is particularly accentuated by the company on account of the fact that as it affords such accessibility it has become almost an essential for what is now generally referred to as the French type of gasoline car.

The patent is a reminder of the several patents issued to the Electric Vehicle Co. last summer on steering pillar gearing, which had been filed in '96 and '97, and which had led to more or less conjecture as to what the future may be expected to disclose in the way of further patent control of what is rather common practice.

WILL SELL IN CUBA

George M. Dickson, of the National Motor Vehicle Co., of Indianapolis, has returned to the factory from a trip to Cuba in the interests of the company. He reports very few automobiles in use there at the present time. Local conditions, customs, duties and lack of charging facilities, prevent the use of large numbers of automobiles, although the future trade at this point should be considerable. The entire city of Havana possesses but a dozen automobiles. Mr. Dickson made arrangements for a satisfactory future representative of the National company, and feels satisfied with the result of his trip.

GARAGE CHANGES HANDS

The Automobile Exchange and Storage Co., 133 West Thirty-eighth street, New York, has recently passed into the control of new people who intend to make this establishment one of the finest in the city. John H. Robertson, for many years general manager and superintendent of the Third avenue elevated railroad, is the president of the new company. He is having the garage refitted and decorated. There are over 12,000 square feet of floor space in the establishment with every facility for repairs.

NEARLY READY TO MARKET

The Standard Wheel Co., of Terre Haute, Ind., whose determination to enter the automobile field was reported two months ago, expects to have a sample machine ready in February and to make deliveries in May. The entry into the field of so large a concern may have far-reaching effects. The company operates two plants in Tennessee, one in Indianapolis, one in Kalamazoo, Mich., one in Ottawa, O., and has plans in preparation for one at Sandusky, O.

AN OVERFLOW EXHIBIT

Manufacturers who have been crowded out of the New York show will be interested in knowing that the Standard Automobile Co., 136 West Thirty-eighth street, New York, has decided to put aside a part of its establishment for exhibitors who cannot find room in the Madison Square Garden. The garage is only a few doors from Broadway.

FLINT VEHICLES READY

The Flint, Mich., Automobile Co., one of the latest concerns to secure space at the Chicago show, has just completed and is now testing its first batch of machines and has another lot coming along. Frank McPhillips, sales manager, seems to be fully persuaded that the new vehicle will prove one of the great features of the show.

MELANGE OF AUTOMOBILE TRADE BREVITIES

Heaton Bressler is said to contemplate the establishment of a motor cycle factory at Peoria, Ill.

An automobile mail route has been established between Portland and Pennville, Ind., distance 12 miles.

A new factory will start in Indiana within a week and will display its first machine at the Chicago show.

F. T. F. Lovejoy is to erect an automobile establishment at Pittsburg. It is reported that the cost will be \$175,000.

George Wahlgreen, a hustling promoter of sport, of Denver, is planning an automobile race meet at Overland Park, on May 30.

A meeting of Terre Haute (Ind.) automobileists is to be held at the Chaney Automobile Co.'s store, this week, to form a club.

The firm of Rex & Dean, which has operated the Novelty Machine Works at East Liverpool, O., has dissolved, Mr. Dean continuing the business.

William Nelson, of Smith Center, Kas., said to be a man of wealth, will run a line of passenger vehicles between his home town and Gaylord.

A press dispatch says that T. B. Jeffery & Co., of Kenosha, Wis., have taken orders for all the vehicles they can deliver and have called in their salesmen.

Atlanta (Ga.) is to have a factory, operated by the \$100,000 De Loach Varispeed Co., of which A. A. and V. H. De Loach and Wm. Owens are the incorporators.

The Temple & Austrian company has leased the store formerly occupied by the Milwaukee company, between the establishments of Githens Bros. and Pardee & Co., Chicago.

The Smith Co., of Topeka, Kas., which has made about a dozen automobiles within a year, is adding a \$10,000 building to its plant and hopes to make fifty cars this year.

C. Dixon, 9 South Tenth street, St. Louis, Mo., describes his air cooled bicycle motor and motor castings sets in a plainly worded circular. This motor has a steel tube cylinder.

An automobile stage line, running four vehicles, is to be operated by the Chicago Transportation Co., between Indiana Harbor and East Chicago, the cars running an hour apart.

Henry J. Kingsbury, John A. MacPeak and James F. Cotter have organized the Reserve Automobile Co., of Camden, N. J., capital \$50,000, to make automobiles and other vehicles.

"Motor Facts" and "What They Say of the Motor That Motes" are two of the most recent publications issued in the interest of Bridgeport motors by the Bridgeport Motor Co., of Bridgeport, Conn.

John W. Gates, W. K. Vanderbilt, Jr., Chas. M. Schwab, John Jacob Astor, W. C. Whitney, A. J. Drexel and H. C. Frick are said to have been purchasers of automobiles at the Paris show.

J. B. and C. F. Lott, well known cycle men of Streator, Ill., and B. H. Campbell have organized, with \$25,000 capital, the Streator Automobile & Mfg. Co., to make vehicles and tubular wheels.

TRADE FIXTURES

NEW YORK STATE AUTOMOBILE SHOW—January 17 to 24, Madison Square Garden.

ANNUAL MEETING NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS—January 24, Madison Square Garden, New York.

ANNUAL BANQUET FOR NEW YORK SHOW EXHIBITORS—January 23, Waldorf-Astoria, New York.

CLEVELAND LOCAL SHOW—February 2 to 9, Gray's Armory.

DETROIT LOCAL SHOW—February 9 to 14, Light Guard Armory.

CHICAGO AUTOMOBILE SHOW—February 14 to 21, Chicago Coliseum.

SMOKER FOR VISITING TRADESMEN AT CHICAGO SHOW—February 19.

GOOD ROADS CONVENTION—February 14 to 21, Chicago Coliseum.

PHILADELPHIA LOCAL SHOW—March 2 to 7.

The Thermobile Co., of America, has been incorporated in Jersey, to make motors and complete cars. Nominal capital, \$1,000,000. The incorporators are Wm. H. Lake, Z. Wirt and D. M. Bell, all of Chicago.

Charles A. Scott has joined the General Automobile Co., of Cleveland, as western traveler. Mr. Scott was, until recently, of the Cedar Rapids (Ia.) Supply Co., and is familiar with the requirements of western dealers.

Fred T. Merrill, hustler, of Portland, Ore., and Spokane, Wash., is in Chicago, and has bought Rambler automobiles for the 1903 business. Merrill has for many years been a successful Pacific coast cycle dealer.

The Syracuse club hoped to hold races next summer in connection with the state fair, but finds Saturday the only day available on account of the trotting circuit. The track, possibly, would not be at its best under those conditions.

The receiver of the Automobile Co. of America, of which Albert T. Otto was the manager, has been instructed by the court to pay a dividend of 10 per cent. There is cash on hand amounting to \$63,000. The plant was sold for \$100,000.

C. F. Splitdorf, of New York, maker of the Splitdorf induction coils and sparking plugs, has returned from a western trip, during which he closed with several more concerns, including some of the new ones. The Splitdorf product is one of the pioneers in the ignition line.

The Neustadt-Perry Co., of St. Louis, Mo., has issued one of the most extensive and carefully prepared catalogues of automobile parts and appurtenances yet produced. It, of course, contains illustrations and descriptions of everything from complete running gears to headlights.

Louis Lindall, formerly connected with the Winton company, is now interested in the Colorado Automobile Co., of Denver, a \$50,000 concern of recent organization, which will deal in automobiles and supplies. The company's place is at 321-325 Sixteenth street, but larger and better quarters are in view. The company handles the Winton and the Baker.

The Ray Automatic Machine Co. has entered the market with automobile parts, making a specialty of fenders, hoods or bonnets, mufflers, tanks and radiators. A. D. Ray has been identified with the manufacture of these parts for several years and is conversant

with the wants of the trade. Among the features of the new goods are a fastener for the fender to obviate rattling, and a lock on the hood for the same purpose. The company is in a position to build any design wanted, not confining its work to particular patterns.

The Turbine Electric Truck Co. has been incorporated, capital \$100,000, with headquarters at Yonkers, N. Y. J. D. Sullivan and H. D. Crippen, of New York, and F. A. Curtiss, of Nutley, N. J., are the incorporators.

A. L. Prescott, president of the Prescott Automobile Co., returned to New York from Europe Saturday. He says that business at the Stanley show in London was very brisk and that steam cars are exceedingly popular in England. Mr. Prescott brought back a big order for future deliveries of Prescotts.

Ed. Orr, who has for some years been connected with the Shelby Steel Tube Co. as western manager, will shortly retire from that position. His future movements are not sufficiently certain to warrant publicity, but more than one excellent opportunity has been offered him to remain in the automobile business.

The Century Tourist, a gasoline vehicle of artistic design, and it is assumed of artistic workmanship, is artistically described and even more artistically illustrated in one of the most artistically compiled and printed small booklets recently issued. It is sent out, of course, by the Century Motor Vehicle Co., of Syracuse, N. Y.

W. H. Kitto, of the Kitto Automobile Co., London, arrived in this country on New Year's day and is now in Buffalo, expecting to arrange for the British representation of two or more lines of cars. He will probably stay for the New York show. Meanwhile he may be addressed by any high-class maker desiring representation in England, in care of MOTOR AGE.

MOTOR AGE celebrates the new year by an increase in size, the assumption of extreme elegance in dress and the addition of noteworthy illustrative adornments. It now rivals in edition de luxe appearance the foreign automobile journals that have previously held the palm over American motor vehicle publications in this particular.—New York Commercial Advertiser.

The Michigan Automobile Co., capital \$150,000, headquarters at Kalamazoo, has so far perfected its preliminaries as to have elected these officers: Chas. D. Fuller, chairman; Frank D. Fuller, secretary; Morris E. Blood, treasurer; D. W. E. Upjohn and Dallas Boudean, directors. The company expects to purchase a plant owned by Montgomery Ward & Co., of Chicago, and to commence manufacturing in a few days.

Long established as a leading maker of oil and gas bicycle headlights, the Twentieth Century Mfg. Co., of New York is now likely to attain the same prominence in the automobile, carriage and launch fields. Its extensive experience has been of great value to it in its investigations, experiments and innovations in the new industry. This season the company has placed several new oil and gas automobile lamps and gas hand lanterns in the market.

DID IT EVER OCCUR TO YOU

that you can save both time and money by getting our complete running gear for Gasoline or Electric Automobiles with chain drive?



WE MAKE
GEARS.
WE DO GEAR
CUTTING.

ANOTHER THING

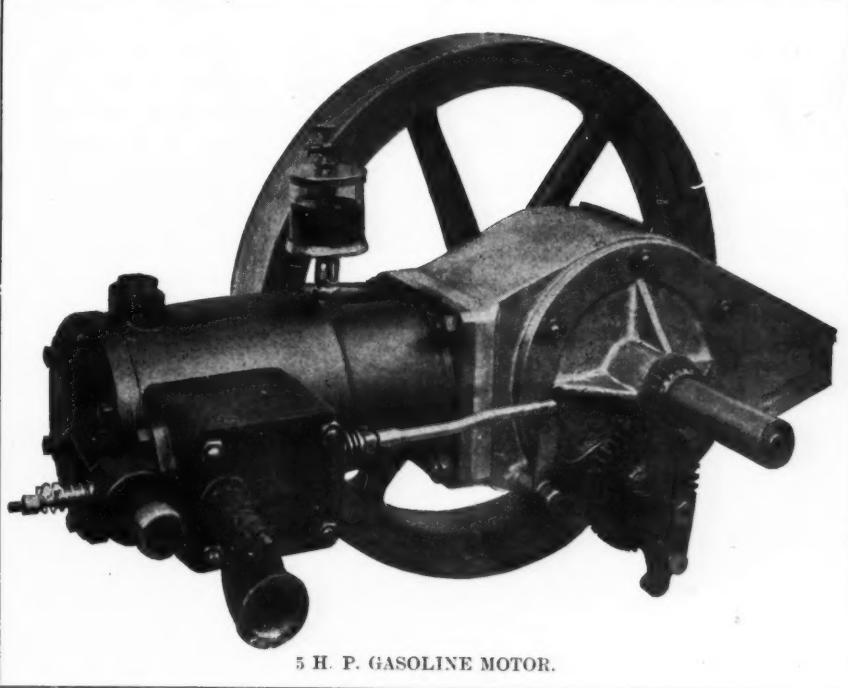
we would like to call your attention to, is the fact that we make a running gear for Electric Automobiles with SPECIAL REAR AXLE to which the motor may be directly attached.

THINK IT OVER!

DON'T WASTE
YOUR TIME

trying to build gasoline motors, when you can get them from us for less money than you can make them yourself.

WE
GUARANTEE
THEM, TOO!



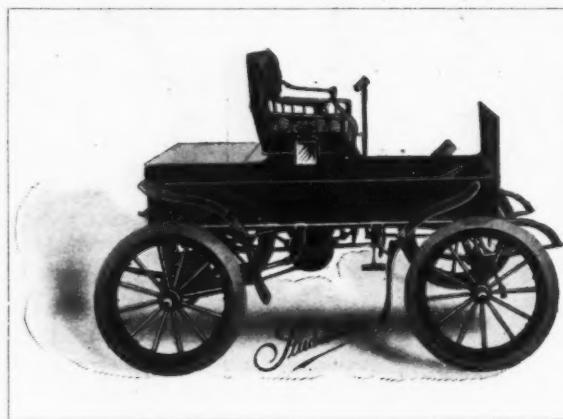
Lindsay Automobile Parts Co.
INDIANAPOLIS, INDIANA

Studebaker Electric Automobiles



NO EXPERT
CHAUFFEUR
N E E D E D .

CAN BE RUN
ANY DAY IN
THE YEAR,
BY ANY
MEMBER OF
THE FAMILY



WIDE TOURING RADIUS.

A 1908 electric vehicle with a battery which is durable and will give a run of 40 miles on one charge.

A SUCCESSFUL HILL CLIMBER.

Our machines will climb grades which are not only steep but covered with sand and mud.

SMOOTH OPERATION.

Controller has four speeds, allowing an unusual smoothness of operation in starting.

RELIABLE BRAKE CONTROL.

All machines equipped with two brakes.

STRENGTH OF CONSTRUCTION.

Built to be worthy in every point of the Studebaker name and reputation.

Studebaker Electric Automobiles will be exhibited at both the New York and Chicago Automobile Shows, and can also be seen at the following repositories of the

STUDEBAKER BROS. MFG. CO.

Studebaker Bros. Co. of New York, Broadway & 7th Avenue, Corner 48th Street, New York City.
Studebaker Bros. Mfg. Co., 378 to 388 Wabash Ave., Chicago, Ill.

Studebaker Bros. Mfg. Co., cor. 15th and Blake Sts., Denver, Colo.
Studebaker Bros. Mfg. Co., 157 to 159 State St., Salt Lake City, Utah.
Studebaker Bros. Mfg. Co., 317 to 319 Elm St., Dallas, Texas.

FIRST-CLASS AGENTS DESIRED
IN TERRITORY NOT ALREADY COVERED.

Factory and General Offices, SOUTH BEND, IND.

FACTS IN BUSINESS LAW

One who adopts the act of another, professing to act for him, must adopt it in toto. He will not be permitted to claim the benefit arising from same, and at the same time refuse the burden.

The receipt and retention of a check given on condition that it is to be accepted in settlement of a matter in controversy involves the acceptance of the condition upon which it has been given or offered.

An agent to collect money cannot bind his principal by any arrangement short of an actual collection of the money. He can accept nothing in payment but money, nor can he commute it in the payment of a debt due from himself.

One is not bound by knowledge acquired by his agent in ordinary social intercourse before the transaction with the principal was contemplated, but only by such knowledge as comes to the agent in the course of the transaction itself.

Where parties capable of contracting enter into an agreement whereby one is to pay and the other is to accept a certain sum in full satisfaction of a disputed claim, the agreement constitutes a valid contract between the parties to same.

The presumption is that an incoming partner into an existing firm does not assume the payment of previously existing debts; but such presumption may be rebutted by satisfactory proof of a contrary intention and agreement between the copartners.

Where an agent's contract of employment requires him to turn over to his employer the identical moneys collected from such employer the latter may bring an action of trover

against him for the conversion of such moneys as he has collected from such employer.

The right of creditors of a bankrupt to pursue and reclaim property claimed to have been fraudulently transferred by an insolvent debtor as a voluntary gift is not limited to such transfers as have been made within 4 months of the commencement of the bankruptcy proceedings.

The settlement of an account and the striking of a balance is a clear admission of a precise indebtedness, and the balance so ascertained becomes a new principal. It cannot be examined into in order to ascertain the items, except upon proof that there was fraud or a mistake.

Where an article is sold and a note given for part of the purchase price, providing that the title to the property shall remain in the seller until the notes are paid, such provision is for the benefit of the seller and he may elect to treat the sale as absolute and on default sue on the notes.

A sale by an insolvent to one of his creditors in payment of a pre-existing debt is not void merely because the creditor knew of an attempt and intent on the part of the debtor to thus hinder or defraud his creditors, where such conveyance did not cover more property than was reasonably necessary to discharge the debt.

The measure of damages in case of a breach of warranty of the quality of goods sold and delivered is the difference in value between the article as delivered and the article as warranted, together with such special damages as are natural and proximate consequences of such a breach, the difference in value at the place where the contract is completed.

RADIATORS IN QUANTITY

The Briscoe Mfg. Co., of Detroit, Mich., started two years ago to manufacture a certain line of supplies for automobile builders and is now among the large providers of such stock. The most prominent specialty in the line is that of radiators for water cooling systems. These are of the continuous coil variety, the tubes being bent on a special bending machine developed for the purpose. Radiators are now made for a large percentage of the trade and at the coming New York show over fifteen different vehicles will be equipped with them. The company claims the distinction of making radiators for both the highest priced automobile produced in the United States and the lowest priced water cooled machine of popularly accredited value.

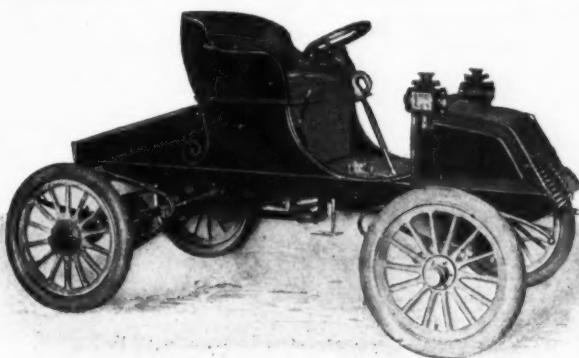
The company has lately completed a radiator containing 168 5-16-inch tubes, there being over 300 feet of tubing altogether. It has 8,000 square inches of copper radiating surface in addition to the radiating surface of the tubes.

A large line of tanks is also produced, the manufacturing capacity being seventy sets a day. These tanks are made from black steel and galvanized after completion that the process of manufacture may not loosen and cause the zinc coating to peel off. A line of mud guards and motor bonnets is now being introduced. The company's plant covers an entire block and besides being fully equipped for sheet metal work is provided with facilities for automatic machine work.

The Syracuse club held its annual election and banquet Monday evening.

THE 1903 GENERAL

A
Serviceable
and
Practical
Runabout



8 H. P. GASOLINE RUNABOUT

A
Dependable
and
Attractive
Machine

FOR ALL SEASONS

Our new illustrated catalog is now ready for distribution. It speaks tersely of the construction and make-up of the new General. It gives "just the information you want." We'll appreciate your inquiry. Write to us—we'll write to you.

THE GENERAL AUTOMOBILE & MFG. CO.

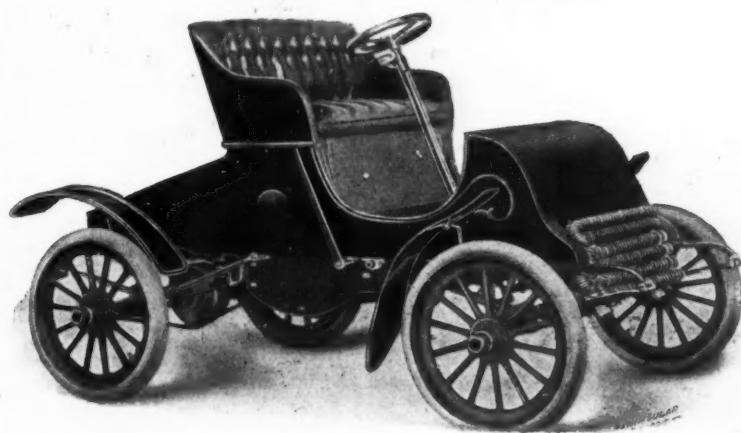
GENERAL OFFICES: 207 Western Reserve Bldg. FACTORY: 1312-30 Hamilton St., CLEVELAND, OHIO

THE CADILLAC

....GASOLINE....



A
SATISFACTORY
RUNABOUT
AND
TOURING
CAR.



\$750.00.

WITH TONNEAU,

\$850.00



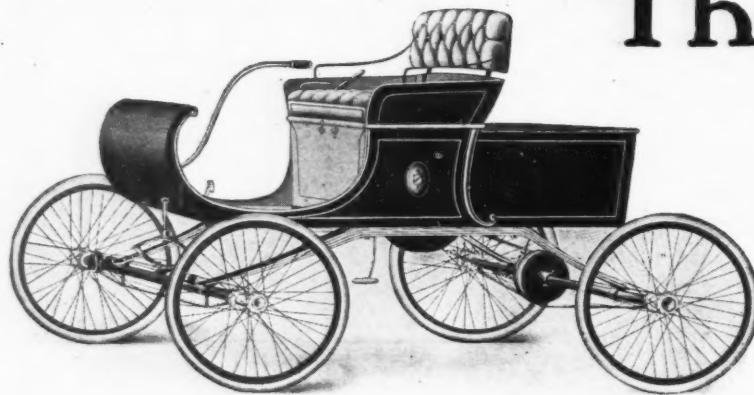
Has actual 6½ horse power motor in which are incorporated the best thoughts, the best efforts, and finest construction of the master builders of gasoline motors. The Cadillac is in a class by itself both in quality of workmanship and material. The finish cannot be excelled, and no car can run better or give more wear. Its speed is from five to thirty miles per hour. A catalogue costs nothing and is sent for the asking.

CADILLAC AUTOMOBILE COMPANY,
DETROIT, MICH

WILLIAM E. METZGER,
Sales Manager.

The Oldsmobile

The Best Thing on Wheels



Will occupy the "center of the stage" at the coming shows. The full glare of the lime light will be turned on the entire construction of this standard Runabout.

Visit our exhibit and see just how this machine is built to run AND DOES IT, and the simple, practical working parts, which leave "nothing to watch but the road."

Price, \$650.00

SELLING AGENTS:

Oldsmobile Company, Los Angeles, Cal.
Oldsmobile Co., New York City, N. Y.
Nat. Capital Automobile Co., Wash., D. C.
Quaker City Automobile Co., Philadelphia, Pa.
H. B. Shattuck & Son, Boston, Mass.
Banker Bros. Co., Pittsburg, Pa.
Oldsmobile Co., Cleveland.
Oldsmobile Co., Githens Bros. Co., Chicago.
Fisher Automobile Co., Indianapolis, Ind.
Olds Gasoline Engine Works, Omaha, Neb.
W. C. Jaynes Auto. Co., Buffalo, N. Y.
F. L. C. Martin Co., Plainfield, N. J.
Agency for Great Britain, The Oldsmobile Company of Great Britain, 100 C Queen Victoria St., London, E. C.

Autovehicle Co., Newark, N. J.
F. W. Stockbridge, Paterson, N. J.
Mississippi Val. Auto. Co., St. Louis, Mo.
George E. Hannan, Denver, Colo.
Day Automobile Co., Kansas City, Mo.
Clark & Hawkins, Houston, Tex.
Hyslop Bros., Toronto, Ont.
The Oldsmobile Co., C. C. Moore & Co., San Francisco, Cal.
John W. Chester Co., Nashville, Tenn.
A. F. Chase & Co., Minneapolis, Minn.
J. E. Richard, Columbia, S. C.

Oldsmobile Co., Milwaukee, Wis.
Rochester Auto. Co., Rochester, N. Y.
Seager & Close, Tucson, Ariz.
F. E. Gilbert, Jacksonville, Fla.
Texas Imp. & Machine Co., Dallas, Tex.
Abbott Cycle Co., New Orleans, La.
C. H. Johnson, Atlanta, Ga.
Sutcliffe & Co., Louisville, Ky.
Brown-Thompson & Co., Hartford, Conn.
Mason's Carriage Works, Davenport, Ia.
Adams & Hart, Grand Rapids, Mich.
Kline Cycle & Auto. Co., Harrisburg, Pa.
Oldsmobile Co., 1300 Jefferson Ave., Detroit, Mich.

WRITE FOR ILLUSTRATED BOOK TO

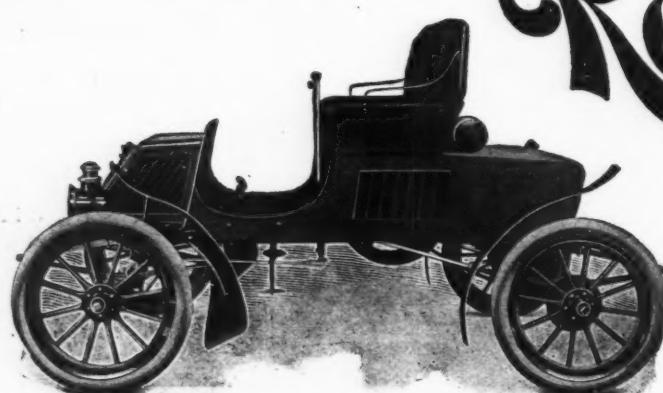
OLDS MOTOR WORKS, 1300 Jefferson Ave., Detroit, Mich.

HONESTLY BUILT

and sold at a fair price, backed with the experience
gained by 30 years' manu-
facturing, the Model "E"

OUR
CATALOGUE
DESCRIBES IT
FULLY.

SHALL
WE MAIL YOU
ONE?



Rambler

**Touring
Car...**

has every improvement that modern demand and extensive use can suggest. Artillery wheels, three-inch tires, 78-inch wheel base, automatic ignition, drum brakes on rear wheels, constant level, positive feed carburetor requiring no adjustment, 6 horse power engine, controlled by the pressure of the thumb. It is easily the equal for general use on average roads to the \$2,500 kind, but at one-third the price,

\$750 F. O. B. Kenosha, Wis.

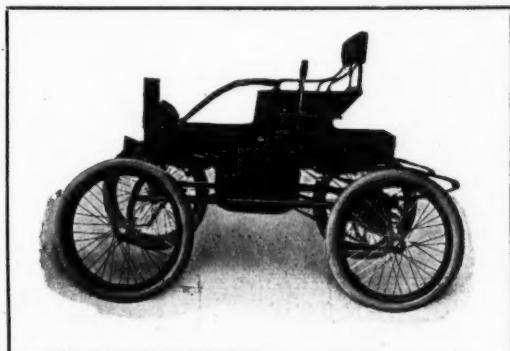
THOMAS B. JEFFERY & CO., Kenosha, Wis.

Spaces 112 and 113 at the New York Show, and 87 and 88 at Chicago.

THE BAKER

IF IT'S A BAKER IT'S THE BEST.

The Most Efficient of all Electric Vehicles.



THE LIGHTEST WEIGHT
THE STRONGEST MADE
THE BEST FINISHED



We will send you a Catalogue or we will write you.
Address

The Baker Motor Vehicle Co., Cleveland, O.

THE NEW ORIENT MODEL OF 1903

The Easiest Car
to Operate in the
World. :: Write
for Catalogue.



Now is the
Time to Secure
the Agency.

ORIENT MOTOR CAR NO. 9.
8 H. P. PRICE \$1200.

WALTHAM MFG. CO., - - - Waltham, Mass.

Before Buying
Examine...

THE WHITE

Steam Touring Car for 1903

THE WHITE is a Steam car, with the distance of a Gasoline and the ease of operation of an Electric. ∴ In the 500-mile Reliability Contest from New York to Boston and return, arranged by the Automobile Club of America, three **White Steam Stanhopes** covered the distance without stop or trouble of any kind—a perfect performance.

The WHITE STEAM GENERATOR

is absolutely non-explosive, gives pressure in five minutes from cold water, and once in motion is self-regulating. The same motive power which has been so successfully used in former White models will be used in the new Touring Car.

Write for full particulars, including Prof. Thurston's report on our Steam Generator, and the official reports of important endurance contests.

SPECIFICATIONS:

PRICE \$2,000.

Seating capacity...Four
Rated Horsepower. Ten
Engine.....Compound
Wheel Base.....6 ft. 8 in.
Tread.....4 ft. 8 in.
Wheels.....30 inches
Tires (Goodrich Clincher).....4 inches
Weight (tanks
filled).....1650 lbs.
Extreme Length...10 ft.
Extreme Width.....5 ft.
Extreme Height 5 ft. 3 in.
Capacity of Gasoline
Tank.....10 gals.
Capacity of Water
Tank15 gals.

EQUIPMENT:

Condenser, Side Lamps,
Set of Tools, Horn, Tool
Case.

WHITE SEWING MACHINE CO. (Automobile Department) CLEVELAND, OHIO

22 Union Square, New York, N. Y.

509 Tremont Street, Boston, Mass.

300 Post Street, San Francisco, Cal.

12 Woodward Avenue, Detroit, Mich.

5979 Centre Avenue, East End, Pittsburg, Pa.

Bankers Brothers Company, Cor. Vine and Broad Streets, Philadelphia, Pa.

Walter C. White, European Representative, 19 Princes St., Westminster, London, England.

609 Main Street, Buffalo, N. Y.

300 Rose Bldg., Cleveland, O.

4259 Olive St., St. Louis, Mo.

1761 Stout Street, Denver, Col.

GODRICH Clincher AutomobileTires

The Original American Clincher

Our construction, our pattern and our style of rim are recognized as the standard by all licensed makers of Clincher Tires.

A Pattern
For Other Manufacturers
A Model Automobile Tire

All repairs and adjustments made at the following branches, which carry a full and complete line of standard sizes of tires and parts constantly on hand:

BRANCHES
1699 Broadway, New York City
141 Lake Street, Chicago
157 Summer Street, Boston
922 Arch Street, Philadelphia
9 W. Huron Street, Buffalo
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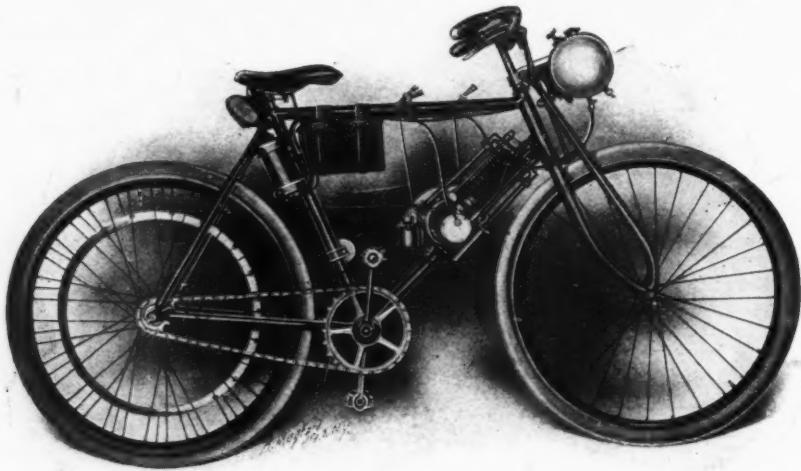
THE B. F. GOODRICH COMPANY
AKRON RUBBER WORKS

AKRON, * * * OHIO

THE A. CLEMENT

MOTOR EQUIPMENT

Applicable to Any Bicycle, Making a Complete and Perfect Motor Cycle



ADVANTAGES { Simple,
Light,
Durable,
Odorless.

Uniform Speed, Always Reliable, Float Carbureter (French Type), Easy to Operate, Inexpensive.

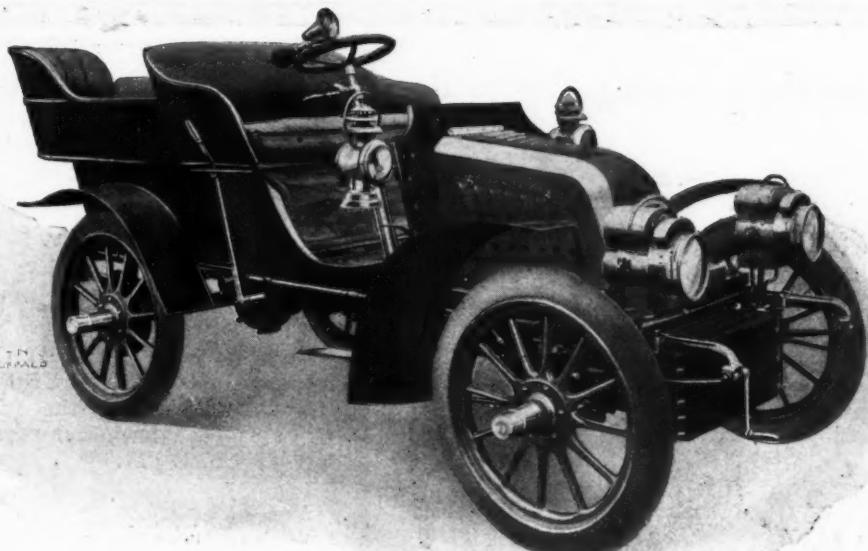
Weight of Equipment, 20 Pounds.

AGENTS WANTED in all Cities in U. S. and Canada.

Write for Terms and Catalogue Giving Details of Equipment.

**The A. Clement Cycle Motor and
Light Carriage Co.**

Main Offices and Factory : : : HARTFORD, CONN.



ARROW MOTOR CAR

Pierce Motorettes

Built to Run All the Time!

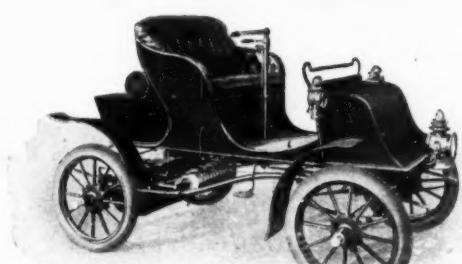
New Models for 1903 will be exhibited for the first time at the New York Show, Space No. 114, and at Chicago Space No. 12.

Arrow Motor Car

Includes all the latest improvements in Moderate Speed, Moderate Weight, and Moderate Price Tonneau Models.

SIMPLE IN OPERATION, UNEQUALLED IN WORKMANSHIP AND FINISH, ELEGANT IN DESIGN.

THE GEORGE N. PIERCE CO. Makers,
BUFFALO, NEW YORK.



PIERCE MOTORETTE

GENERAL SELLING AGENTS:

Banker Bros. Co.	New York. Philadelphia. Pittsburg.
Automobile Headquarters, Boston.	
Miller-Mundy Motor Car Co., Utica, N. Y.	
R. W. Whipple, Binghamton, N. Y.	
J. J. Mandery, Rochester, N. Y.	
Toledo Motor Carriage Co., Toledo, Ohio.	
R. V. Connerat, Savannah, Ga.	
E. P. Moriarity & Co., Kansas City, Mo.	

"America's Leading Automobile"



Do you want the **VERY BEST** automobile built in America next year? If so, do not purchase until you have seen

THE NEW

Searchmont.

at the **NEW YORK AND CHICAGO AUTOMOBILE SHOWS.** If you cannot attend the show, write us for information regarding our **TYPE VII.**

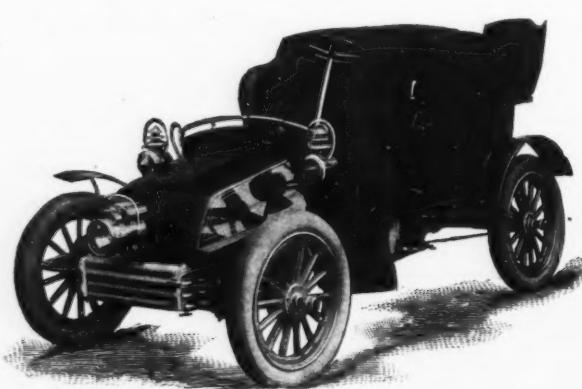
**SEARCHMONT
AUTOMOBILE CO.**

Philadelphia,
U. S. A.

Suite 651 North American Building.

THE "YALE" CAR

AN
ATTRACTIVE
VEHICLE
AT AN
ATTRACTIVE
PRICE.



MADE BY
AN
ESTABLISHED
CONCERN
WITH A
REPUTATION.

Agency Propositions Considered.
We Exhibit at New York and Chicago.

THE KIRK MFG. CO., Toledo, O.

A NEW ONE

10 Other
Models for
1903

• • •
All leaders in
their class



This Vehicle
the Most
Powerful
Electric
Runabout on
the Market

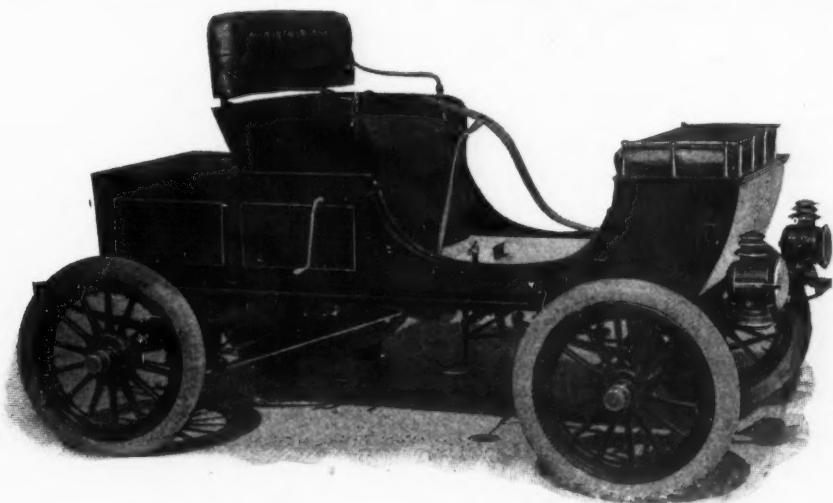
*Catalogue upon application.
Agents wanted in unoccupied territory.*

*"The Cadillac Automobile Co., of Illinois,
1312 Michigan Ave. Distributors for the
City of Chicago."*

National Motor Vehicle Co.
1200 E. 22d St.....INDIANAPOLIS, IND.

CENTURY TOURIST GASOLINE MOTOR CAR

\$
700
\$



\$
700
\$

Acknowledged by Experts to be the Best and Most for the Money
Offered in an Automobile.

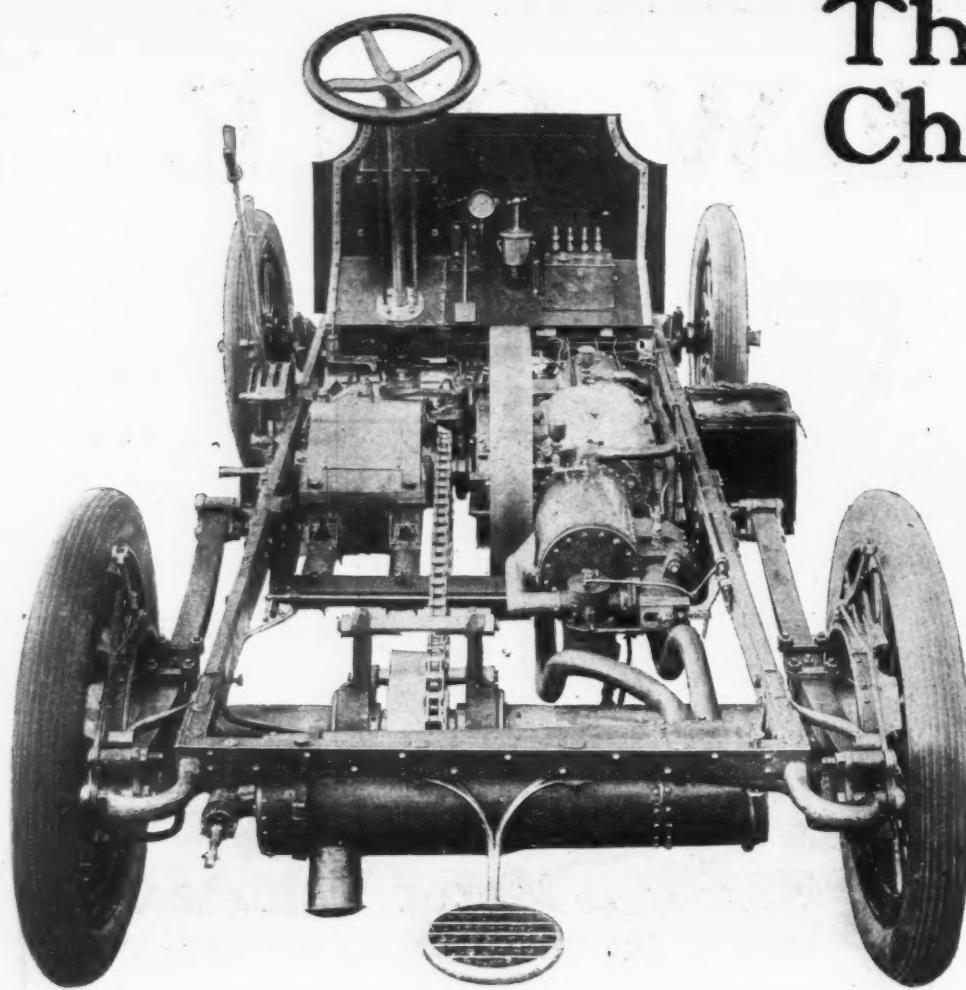
Space 3--Exhibition Hall--New York Show.

Orders placed now insure spring delivery.

Write for Catalogue.

Century Motor Vehicle Co., Syracuse, N. Y.

The Stearns Chassis



25 horse power Motor, silent and practically no vibration. Three speed, sliding gear transmission, direct connected with rear axle. Frame "Bois Arme" type, mounted on forty-inch springs, with thirty-four-inch wheels and eight-foot wheel base. Small tube radiator and 200-mile tank capacity. All controls at the wheel. Spark coils, oilers, switch and circulation indicator on dash; battery box on side of frame.

A Lot of Good, Practical Ideas to think about.

STAND No. 16 NEW YORK SHOW.

The F.B. Stearns Co.

CLEVELAND, OHIO, U. S. A.

Stearns Cars are Worth More than they cost.

Thomas Tonneau Model 17 for 1903

Price:
\$1,250.



Embodies all the best features usually found on the most expensive foreign and American cars. The quality and construction of this new model is unsurpassed regardless of price or manufacture.

This machine stands in a class alone and in order to be fully appreciated must be seen.

Model 17 speeds up to 25 miles an hour and will without difficulty climb 30 per cent grades.

It is especially constructed to meet the most rigid requirements of families, business and professional men.

Agents:—We have a liberal proposition to offer and it will be necessary to order early as territory is rapidly being taken.

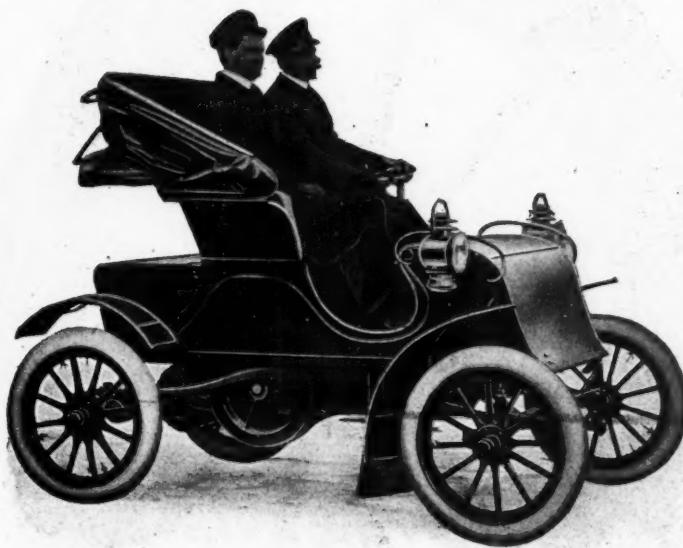
Will Exhibit at the New York and Chicago Shows.

E. R. THOMAS MOTOR COMPANY
(Buffalo Automobile & Auto-Bi Co.)

Branches: NEW YORK: E. J. Edmond, 52 W. 43rd St.
BOSTON, MASS.: C. S. Henshaw, 145 Columbus Av.

BUFFALO, N. Y.

Waterless Knox



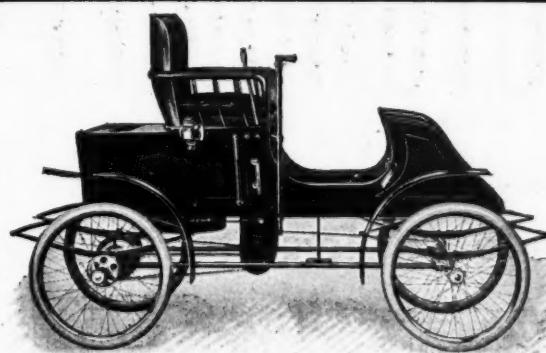
1903 Model now ready, with many new and desirable features, much stronger and more durable in every detail than the 1902 Model. The ideal runabout, touring car and doctor's carriage combined.

WILL EXHIBIT AT THE NEW YORK AND CHICAGO SHOWS

SEND FOR CATALOG AND TESTIMONIALS

Knox Automobile Co., SPRINGFIELD, MASS.

NEW YORK, 152 W. 38th St. Feb. 1, at 146 W. 39th St.
Western Agency, Nat'l Automobile and Mfrs. Co., 26 Fremont St., San Francisco, Cal.



TWO PASSENGER

Gold Medal Winner
IN RELIABILITY RUN
A Steam Car for the Posted

1903 Models Now Ready. :: Exhibited at New York and Chicago Shows. :: Send for Catalogue. Agents Will Be Appointed.

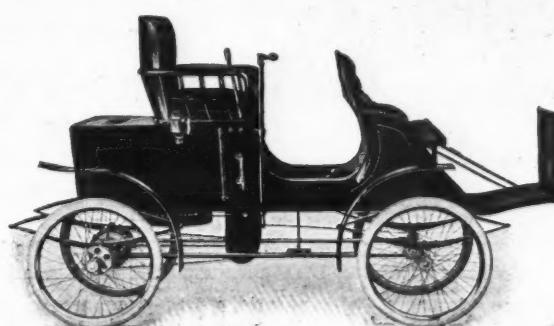
THE PERFECT PRACTICAL PRESCOTT

...A S T E A M C A R...

Made so Perfectly that it is Appreciated by the Experienced Driver :: :: ::
THEY WHO KNOW IT ARE LOUD IN ITS PRAISE

IF YOU HAVE HAD TROUBLES, GET A PRESCOTT
THEY SATISFY

Prescott Automobile Mfg. Co.
83 Chambers Street, New York



FOUR PASSENGER

Counting the Cost

When you figure up the cost of several sets of imperfect wood and wire wheels against that of one set of

MIDGLEY

Steel Tubular Wheels

You then commence to reason—and once a man commences to reason, he is on the right path. After getting Midgley wheels, there would be no leaving your automobile in some farmer's barn on the road until you can get new wheels put on it in order to get home.

Midgley Manufacturing Comp'y
COLUMBUS, OHIO, U. S. A.

"The Wheel That's True."



Columbia

AUTOMOBILES

FOR 1903

New Models. Many Improvements.

Electric and Gasoline Vehicles for all Requirements.



Columbia Electric Coupe--Rear Driven.

Runabouts, Victorias, Surreys, Tonneaus, Cabriolets, Coupes, Hansoms, Broughams, Special Service Wagons, Delivery Wagons, Trucks, Patrol Wagons, Ambulances.....

Leading Models, Including the New

**Columbia 4-Cylinder,
20 H. P. Gasoline Car**



Columbia Electric Coupe--Inside Operated.

Will be Exhibited at the New York and Chicago Shows.

Catalogues and Complete Information will be Sent on Request.

ELECTRIC VEHICLE CO., HARTFORD, CONN.

NEW YORK: 100 Broadway.

BOSTON: 43 Columbia Av.

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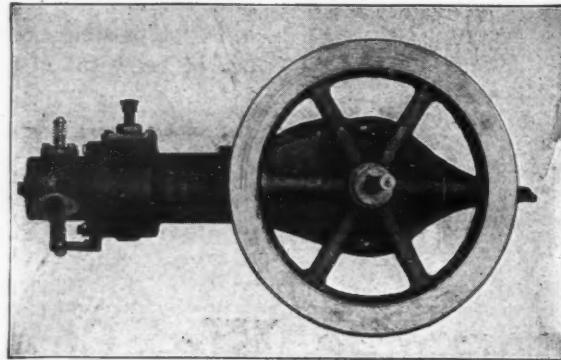
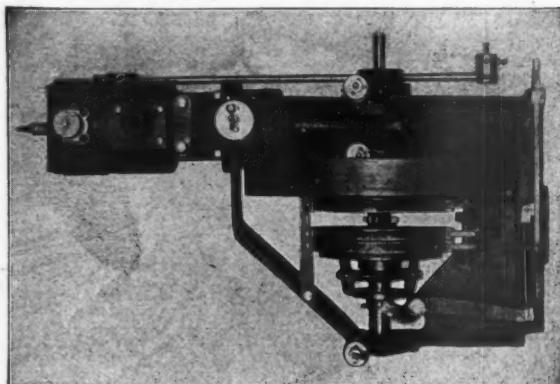
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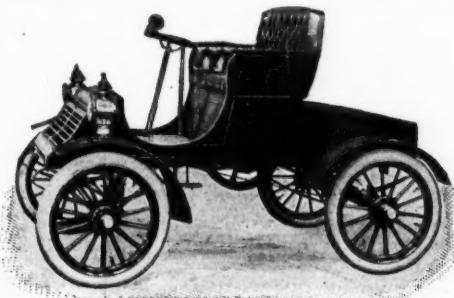
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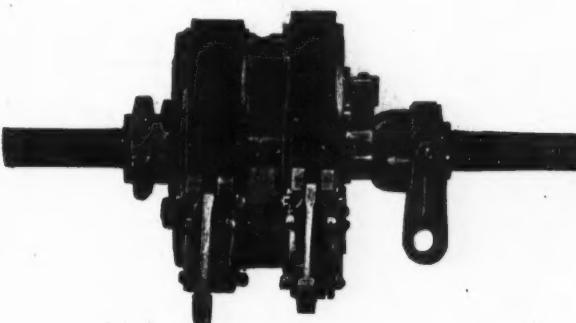
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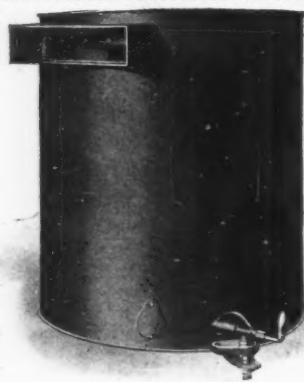
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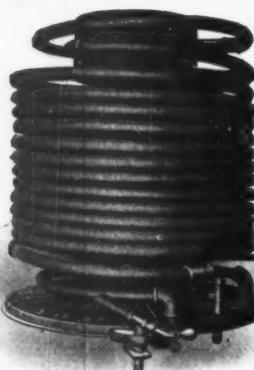
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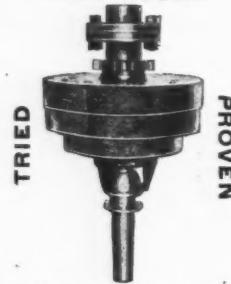
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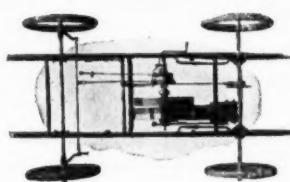


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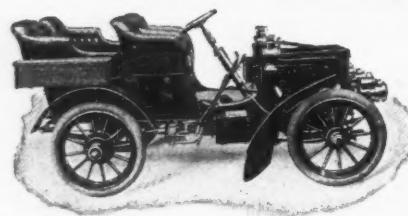
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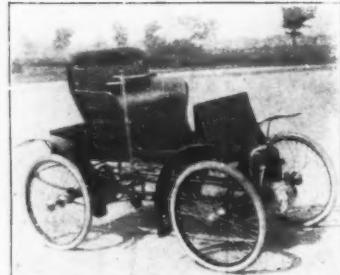
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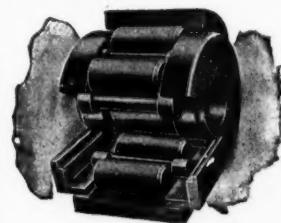
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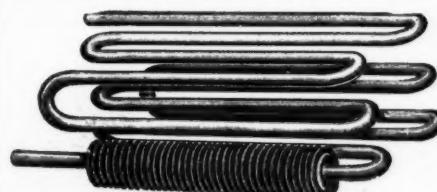
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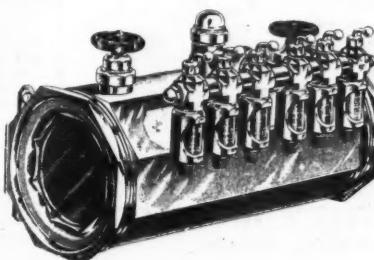
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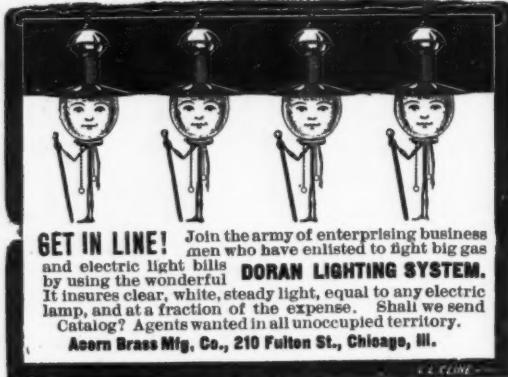
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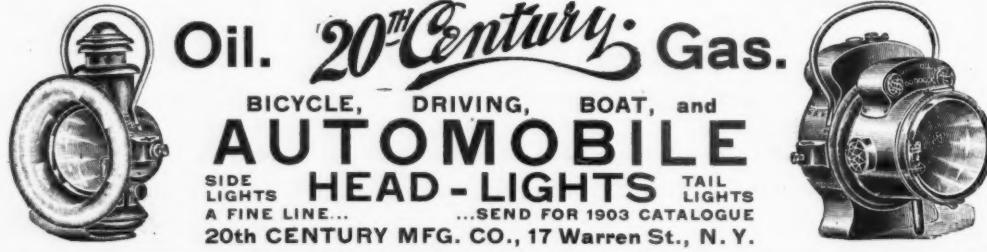
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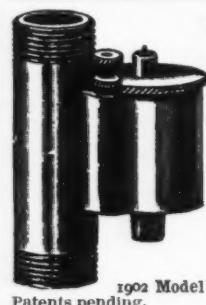
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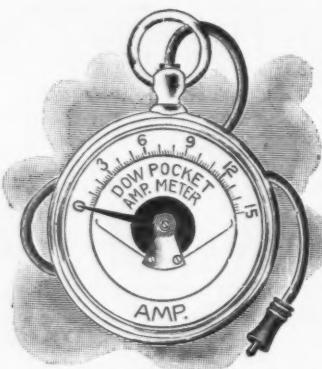
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The perfect Carbureter,
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AGE, in Indiana,
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Salary, commission
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I AM desirous of allying myself with some concern making—or one wishing to make—Electrical Automobiles. I am an Associate Member of the American Institute of Electrical Engineers, and am thoroughly conversant with modern practice in the automobile field. Am intensely practical, and have worked out some features, which applied will produce a line of vehicles of an efficiency heretofore unattainable. Would invest money on the right proposition. Address "F. J." care Motor Age, Monon Bldg., Chicago.

SECOND HAND Toledos, Mobiles, Locomobiles, Whites, steam; Columbia, Waverly and Woods, electrics; Haynes-Apperson, Olds, Ramblers, Fournier-Searchmonts and Columbias, gasoline. Prices from \$200 up. Write for descriptions and photographs. Mississippi Valley Automobile Co., 3935 Olive st., St. Louis, Mo.

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FOR SALE—1902 Knoxmobile in fine condition, a great hill climber, speedy and good as new; top, boot, etc.; cost \$1,150; best bargain ever offered. F. E. Constans, Brockton, Mass.

JUST RECEIVED—A carload of Murray gasoline runabouts; handsome in appearance: equal in power, speed and endurance to machines costing twice as much; will make very interesting prices. See them. Mead Cycle Co., 1243-5 Wabash Ave.

DO YOU WANT TO SELL YOUR AUTO-
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price, or sell on commission at your price; best
facilities and largest auto, storeroom in Chicago.
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FOR SALE—Steam dos-a-dos in perfect order.
Will sell cheap. Address Louis J. Yeoman,
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WANTED—An automobile that the Raymond
Brake cannot stop. Address A. H. Raymond,
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AUTOMOBILES bought, sold and exchanged.
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FOR SALE—Running-gear and body complete.
Suitable for any kind of power. Big cash
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FOR SALE—Curtis automatic boiler feed regu-
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Buel H. Green, Hotel Bellevue Terrace, Los An-
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HAYNES-APPERSON 1902 UP-TO-DATE
phaeton for sale. Splendid machine for
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order. Tried and proven on worst roads and
hills. Little used. Taken in trade. Keeping
duplicate for own use. Extra reversible front
seat. Send for photo and description. Cost
\$1,600 and worth that now. Price \$1,250 on
cars. Address P. O. Box 452, Pittsburg, Pa.

TWO COLUMBIA WAGONETTES, MARK XI.
with two extra sets of batteries, all in fine
condition and splendid working order. Originally
cost \$5,500. Bargain if sold immediately. Ad-
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FOR SALE

Three Mobiles, A-1 shape, \$195.00 each; Win-
ton Touring Cars; Oldsmobiles; Haynes-Apper-
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trics; Waverly Electrics; National Electrics;
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Cars; Winton semi-racers; Winton Phaetons;
Motor Bikes, etc.

Big clearance sale at reduced prices, to sell
quick. Send 3c in stamps for the first and largest
complete catalogue of second-hand automo-
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full description of 35 first-class vehicles at bar-
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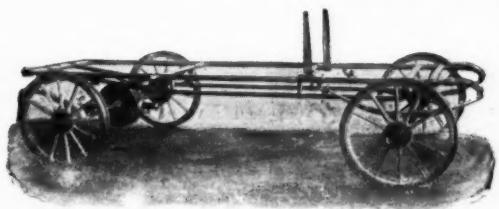
We buy, trade for and sell more automobiles
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Get our list.

The Fisher Automobile Co.
Indianapolis, Ind.



WYOMA GASOLINE MOTOR.

Single Cylinder, 8 H. P., 135 pounds.
Double Cylinder, 15 H. P., 265 pounds.



TUBULAR RUNNING GEAR FOR TONNEAUS.
82-inch Wheel Base. 52-inch Tread.

Reading Automobile & Gear Co.

TENTH AND EXETER STREETS
READING, PA.

MANUFACTURERS OF

Gasoline Motors, Differential Spur Gears,
Transmission Gears, Tubular Running
Gears, Radiating Coils, Mufflers, Aluminum
and Brass Hoods, Wood and Wire
Wheels, Carbureters : : : : : : : : :

Our Motors are of French Type and Equal in Finish and
Service to Best Foreign Makes.

The Differential Gear has Manganese Bronze Bevel Gear.
Fitted for either $1\frac{1}{4}$, $1\frac{1}{2}$ or $1\frac{1}{4}$ inch axles. Is made for Direct
Drive, Rod Transmission.

The Transmission Gear is built on a
new system. No Bevel Gears. Gears
always in Mesh. Ball Thrust at each
end of shaft. Enclosed in Aluminum
Case. Will transmit up to 20 H. P.

We make a Tubular Running Gear for
tonneaus that is a marvel of workman-
ship, finish and construction. All ma-
terial is of the best and the Bearings are
extra heavy. The Differential on this
is fitted for either Sprocket or Bevel
Gear.



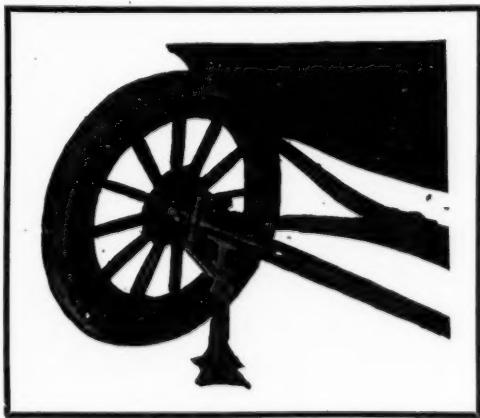
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SPUR GEAR.
8 pitch, - 60 Teeth.



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3 Speeds forward and 1 Reverse.

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THE "B. B." JACKS



Will Double the Life
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Prices: \$1.75 to \$4.00 each.

Insist on having the "B. B." Jacks.



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Factory: NEWARK, N. J.

115 Broadway, NEW YORK

AGENTS: Wallace Supply Co., 56 Fifth Av., Chicago, Ill.

A. L. Dyke, 1402 Pine St., St. Louis, Mo.

The Voice of Experience

Extract from letter to the Winton Company, signed by Mr. F. B. Forman, Minneapolis, Minn.

"Have sold my 15 h. p. Winton Touring Car for \$1,800, and about a week ago placed an order with Mr. Bennett, your local agent, for one of your new 20 h. p. cars. I also persuaded Mr. Asa Paine, a friend of mine, to wire Mr. Bennett in your care today placing an order also. This is the gentleman who accompanied me to Chicago two years ago, but you had no exhibit at the show and he purchased a —— Steamer. Since then he has had one or two others but none of them were satisfactory. You know that I am more than pleased with the different machines I have had from your company. The Stanhope I bought three years ago has had constant service ever since without a breakdown or stoppage; it has been run this year at least 25 miles a day back and forth from my summer house to my office, and to all appearances is good for several more years' service. It has never been in a shop for repairs, and I have never spent a five-cent piece on it other than for fuel and oil, since it came into my possession. Could a record be better?

"I predict a good deal of business for your company in the Northwest during the coming season, as your cars stand far ahead of anything else we have up here, and I guess we have about every known American make as well as many French machines."



PRICE, COMPLETE, \$2,500.00

It is just the time now to place your order for one of the new model Wintons if you want delivery early in the season.

We have selling depots in the principal cities of America. A new catalog is out; it will interest those who insist on keeping up with the game.

THE WINTON MOTOR CARRIAGE CO.

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